FM 90-7
Combined Arms Obstacle Integration

HEADQUARTERS, DEPARTMENT OF THE ARMY

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Combined Arms Obstacle Integration

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Combined Arms Obstacle Integration

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Preface

Field Manual (FM) 90-7 is intended for the combined arms commander and staff. It encompasses doctrine established in *FMs 5-100, 6-20 series, 71-100, 100-5, and 100-7.* The doctrine presented in the following chapters seeks to develop the full potential of obstacles as a component of combat power. Each chapter contains tactics, techniques, and procedures (TTP) that take the doctrinal foundation and provide the "How To" connection.

This manual initially defines and establishes the principles for obstacle operations then applies them at echelons from corps to company team, concentrating on essential TTPs. *Chapter 2* provides the key obstacle terms that will be used throughout the manual. *Chapter 3* covers obstacle integration theory. *Chapter 4* covers obstacle planning from corps through brigade level. *Chapter 5* covers obstacle planning from task force (TF) through company team level. *Chapters 4 and 5* build on the foundations in *Chapters 1 through 3* and establish echelon-specific TTPs. *Chapters 6 through 8* provide considerations for specific types of obstacles.

Three appendixes provide the additional tools that facilitate successful planning and execution. *Appendix A* provides information on individual obstacles. *Appendix B* addresses the critical activities in reporting, recording, and tracking. Finally, *Appendix C* describes obstacle resourcing and supply.

Throughout this manual, the terms brigade, TF, and company team are used to refer to all friendly brigade-, battalion-, and company-size units (to include cavalry units) unless otherwise noted. The terms regiment, battalion, and company are used only when referring to enemy units unless otherwise noted.

This publication implements international *Standardization Agreement (STANAG) 2017.*

The proponent for this publication is Headquarters (HQ), United States (US) Army Training and Doctrine Command (TRADOC). Submit comments and recommendations on Department of the Army (DA) Form 2028 and forward it to: Commandant, US Army Engineer School, ATTN: ATSE-T-PD-P, Fort Leonard Wood, MO 65473-6500.

Unless otherwise stated, masculine nouns and pronouns do not refer exclusively to men.

Chapter 1

Obstacles and the Combined Arms Team

Obstacles are any characteristics of the terrain that impede the mobility of a force. Some obstacles, such as mountains, rivers, railway embankments, and urban areas, exist before the onset of military operations. Military forces create other obstacles to support their operations. Commanders use these obstacles to support their scheme of maneuver. When integrated with maneuver and fires, obstacles can create a decisive battlefield effect. Obstacle plans must mature as the commanders' plans mature.

HISTORICAL USE OF OBSTACLES

History shows that obstacles rarely have a significant effect on the enemy if units do not integrate them with friendly fires. The following historical vignette from World War II is an example of obstacles that were not integrated with fires.

In February 1942, an engineer lieutenant with two noncommissioned officers (NCOs) received orders to supervise the installation of a minefield to support the defense of an American infantry battalion near the Kasserine Pass in Tunisia. The lieutenant set off at 1930 hours with a truckload of mines, to link up with one of the infantry battalion's companies. The company was to provide him with a work detail to install the mines and, more importantly, provide the location of the minefield.

At 2330 hours, he arrived at the infantry company command post (CP), but no one at the CP could tell him the whereabouts of the work detail. Nor could anyone tell him where the minefield should go or what role the minefield was to play in the defense. The company executive officer (XO) told the engineer to go down the road in the direction of the enemy. He assured the lieutenant that somewhere along the road he would meet someone who undoubtedly was waiting for him.

At 0130 hours, the lieutenant returned to the CP after searching along the road and finding no one. He insisted on speaking with the infantry company commander who was sleeping. The infantry company commander told the lieutenant that he would provide him with a forty-man detail, led by an infantry lieutenant who would show the engineer where to install the minefield.

At 0330 hours, the infantry lieutenant showed up with a twelve-man detail. Apologizing for the small number of men, the infantry lieutenant also told the engineer

that he had no idea where the mines were to go. The engineer lieutenant moved out with the detail to choose a site for the minefield himself. Unfortunately, he had never seen the site in daylight and was unable to ensure that the obstacle was covered by fire (it was not). Additionally, the lieutenant had a small, untrained work crew, without the tools to bury the mines.

When the first Germans arrived at the minefield, they found mines hastily strewn across the road, from a hill on one side to the road embankment on the other (about 100 meters). Most mines were not even partially buried. German engineers quickly removed the mines from the road, and the German force continued forward, unmolested by American fires. The minefield was virtually useless.

Despite all of the problems that the lieutenant encountered, his efforts would not have been for nothing if the minefield had been integrated with fires. Small arms and artillery might have wreaked havoc on the dismounted German engineers, while a single antitank (AT) weapon might have done the same to the German tanks halted behind the minefield.

The following historical vignette from the Korean War illustrates the possibilities when a unit integrates fires and obstacles.

In August of 1950, an American infantry regiment was defending along a stretch of the Taegu-Sangju Road known as the "Bowling Alley" in the Republic of Korea. The regiment had artillery and a few tanks in support.

The attacking North Koreans had the advantage of superior numbers of armored vehicles. However, as part of their defense, the Americans laid AT minefield close to their infantry positions so that they could cover the minefield with small-arms fire. They also preregistered artillery and mortar fires on the minefield.

When the North Koreans attacked, they would invariably halt their tanks and send dismounted infantry forward to breach the minefield. When the infantry reached the minefield, the Americans would open up with machine-gun fire and pound the enemy with artillery and mortar fire. Simultaneously, the American tanks and AT weapons would start firing at the North Korean armored vehicles.

In one night engagement, the Americans destroyed eighteen North Korean tanks, four self-propelled guns, and many trucks and personnel carriers, while taking only light casualties. Although the obstacles alone did not defeat the enemy, friendly fires combined with the effects of the obstacles inflicted heavy losses on the enemy and halted their attack.

CHARACTERISTICS OF OBSTACLES

Some obstacles, such as antitank ditches (ADs), wire, road craters (RCs), and many types of roadblocks, have virtually remained the same since World War II. They rely on a physical object to impede vehicles or dismounted soldiers. Normally, they do not damage or destroy equipment, nor do they injure or kill soldiers. One exception is a booby-trapped obstacle that, when it is moved, triggers an explosive device; therefore, these obstacles are passive in nature.

Mine warfare, however, has changed significantly. Mines, with different fuze types and explosive effects, are different from the mines of the World War II era (which required physical contact and relied on blast effect). Today's mines are triggered by pressure, seismic, magnetic, or other advanced fuzes. Mines that self-destruct (SD) at preset times give commanders influence over how long they remain an obstacle. The invention of programmable mines that can recognize and attack specific types of vehicles within an area brings another dimension to the battlefield. Mine warfare

technology continues to outpace countermine technology.

Commanders at every echelon consider obstacles and their role in multiplying the effects of combat power to integrate obstacles into all combined arms operations. Obstacles that are not properly integrated with the scheme of maneuver are a hindrance and may be detrimental to the friendly scheme of maneuver by restricting future maneuver options. They will inhibit maneuver until they are breached or bypassed and ultimately cleared. The technology used to create obstacles may continue to become more complex; however, the basic concepts that affect the integration of obstacles into the commander's plan will remain the same.

DYNAMICS OF COMBAT POWER AND OBSTACLE INTEGRATION

Commanders combine four primary elements (the dynamics of combat power as described in *FM 100-5)* to create combat power. They are—

- Maneuver.
- Firepower.
- Protection.
- Leadership.

Obstacles, when properly planned and integrated into the scheme of maneuver, contribute to combat power.

MANEUVER

Maneuver is the movement of combat forces to gain positional advantage, usually to deliver—or threaten delivery of—direct and indirect fires. The effects of maneuver also may be achieved by allowing the enemy to move into a disadvantageous position. Effective maneuver demands air and ground mobility, knowledge of the enemy and terrain, effective command and control (C2), flexible plans, sound organizations, and logistical support.

Effective obstacle integration enhances the force's ability to gain, retain, or secure the positional advantage. The commander and staff use obstacle integration to develop an obstacle plan as they develop the maneuver plan. They use obstacle control to preserve and protect friendly maneuver and shape enemy maneuver. They use obstacles to put the enemy into a positional disadvantage relative to the friendly force.

FIREPOWER

Firepower provides the destructive force to defeat the enemy's ability and will to fight. It facilitates maneuver by suppressing the enemy's fires and disrupting the movement of his forces.

Obstacle integration multiplies the effects and capabilities of firepower. Obstacle integration establishes a direct link between fires, fire-control measures, and obstacle effects. The combination of firepower and obstacles causes the enemy to conform to the friendly scheme of maneuver. Obstacles magnify the effects of firepower by—

- Increasing target acquisition time.
- Creating target-rich environments.
- Creating vulnerabilities to exploit.

PROTECTION

Protection is the conservation of the fighting potential of a force so that commanders can apply it at the decisive time and place. Protection has the following components:

- Maintaining operations security (OPSEC) and deception.
- Keeping soldiers healthy.
- Maintaining soldiers' fighting morale and safety.
- Avoiding fratricide.

Friendly forces use OPSEC to deny the enemy information about friendly force obstacles to inhibit the enemy's breaching or bypassing efforts. They use phony obstacles to deceive the enemy about locations of actual obstacles and friendly positions. They use obstacles to prevent enemy entry into friendly positions and installations to help protect soldiers from enemy assaults. Friendly forces record, report, and disseminate obstacle information and take other actions to protect soldiers from friendly obstacle impacts. These impacts range from injuries or damage to equipment, resulting from unexpected encounters with barbed wire obstacles, to fratricide caused by hitting mines installed by friendly units.

LEADERSHIP

The essential element of combat power is competent and confident leadership. Leadership provides purpose, direction, and motivation in combat. It is the leader who combines the elements of combat power and brings them to bear against the enemy. The competent leader must know and understand soldiers and the tools of war to be successful in combat.

Obstacle integration is a leader task. Obstacle integration ensures that obstacles have the right priority and that units construct them in the right place and at the right time and cover them with fire. Successful obstacle integration allows leaders to—

- Establish a clear link between force allocation, direct-and indirect-fire plans, maneuver, and the obstacle plan.
- Ensure that weapons capabilities and obstacle effects are compatible.
- Provide obstacle control.
- nsure that obstacles are designed to achieve the desired effect.

Obstacle integration cuts across all functional areas of the combined arms force. Intelligence and obstacle integration provide the commander with the means to maximize obstacle effects and affect both enemy and friendly maneuver. The maneuver commander uses obstacles integrated with fires and maneuver to create vulnerabilities and ensure the enemy's defeat. Combat service support (CSS) units anticipate and transport obstacle material to support the obstacle effort. Effective C2 provides the unity of effort that drives obstacle integration throughout all echelons of the force.

OTHER OBSTACLE CONSIDERATIONS

The overriding consideration in planning obstacles is accomplishment of the mission; however, there are two considerations that may not be apparent in terms of the current military mission. They are—

- Obstacle clearing at the cessation of hostilities.
- Obstacle effects on noncombatants and their environment.

The Army's keystone warfighting doctrine, *FM 100-5,* states that "even in war, the desired strategic goal remains directed at concluding hostilities on terms favorable to the US and its allies and returning to peacetime as quickly as possible." Once US forces have accomplished their mission, obstacles in the theater of operations (TO) must be cleared. Many of these obstacles will include mines, booby traps, and unexploded ordnance (UXO) that pose a threat to persons attempting to clear the obstacles.

OBSTACLE CLEARING

Obstacle-clearing operations continued for years in Kuwait following the end of the 1990-1991 Persian Gulf War, largely due to a lack of accurate minefield records by the defending Iraqi forces. The minefield continued to threaten civilians long after hostilities were concluded and caused numerous casualties to military and civilian personnel.

Appendix B addresses the procedures that the Army uses to report, record, and track obstacles of the friendly force and of the enemy. Accurate reporting, recording, and tracking not only will prevent fratricide but will expedite clearing operations when peace is restored.

EFFECTS ON NONCOMBATANTS

Commanders also consider the effects of obstacles on noncombatants and their environment. Obstacles frequently modify terrain through demolition, excavation, and other means. Some obstacle actions, such as destroying levees, setting fires, felling trees in forested areas, or demolishing bridges, may have immediate impacts on noncombatants and often will have long-term effects on them and their environment.

Commanders minimize the effects of obstacles on noncombatants and the environment if militarily possible. For example, if the enemy can be prevented from using a bridge by means other than demolishing it, commanders choose the less damaging course of action (COA). Commanders avoid unnecessary destruction of farmland or forests or pollution of water sources when creating obstacles. Care exercised by commanders will alleviate long-term negative effects on noncombatants and the environment.

Obstacle integration occurs because of the deliberate actions of commanders and staffs. The remainder of this manual focuses on providing the doctrine and the TTP that commanders and staffs use to ensure that obstacle integration is successful.

Chapter 2

Obstacle Framework

This chapter provides a framework of terms and definitions that apply to obstacle planning and integration. Precise use of these terms creates a common language and prevents confusion during planning and execution. The terms are presented in the following general categories:

- Obstacle classification.
- Obstacle intent.
- Obstacle protection.
- Obstacle C2.

OBSTACLE CLASSIFICATION

Obstacles are any physical characteristics of the terrain that impede the mobility of a force. Obstacles fall into the following categories (see *Figure 2-1, page 2-2):*

- Existing obstacles.
- Reinforcing obstacles.

Although not a separate type of obstacle, units can use phony obstacles. Phony obstacles give the appearance of actual obstacles but require only minimal resources to emplace. They deceive the enemy by providing the visual signature, or other signatures, of actual tactical or protective obstacles. *Appendix A* describes phony obstacles.

EXISTING OBSTACLES

Existing obstacles are obstacles that are present on the battlefield as inherent aspects of the terrain. The types of existing obstacles are—

- Natural.
- Cultural.

Natural obstacles are terrain features, such as rivers, forests, or mountains. Cultural obstacles are man-made terrain features, such as towns, canals, or railroad embankments.

REINFORCING OBSTACLES

Reinforcing obstacles are obstacles specifically constructed, emplaced, or detonated by military forces. The categories of reinforcing obstacles are—

- Tactical.
- Protective.

Tactical Obstacles

The primary purposes of tactical obstacles are to—

- Attack the enemy maneuver.
- Multiply the effects and capabilities of firepower.

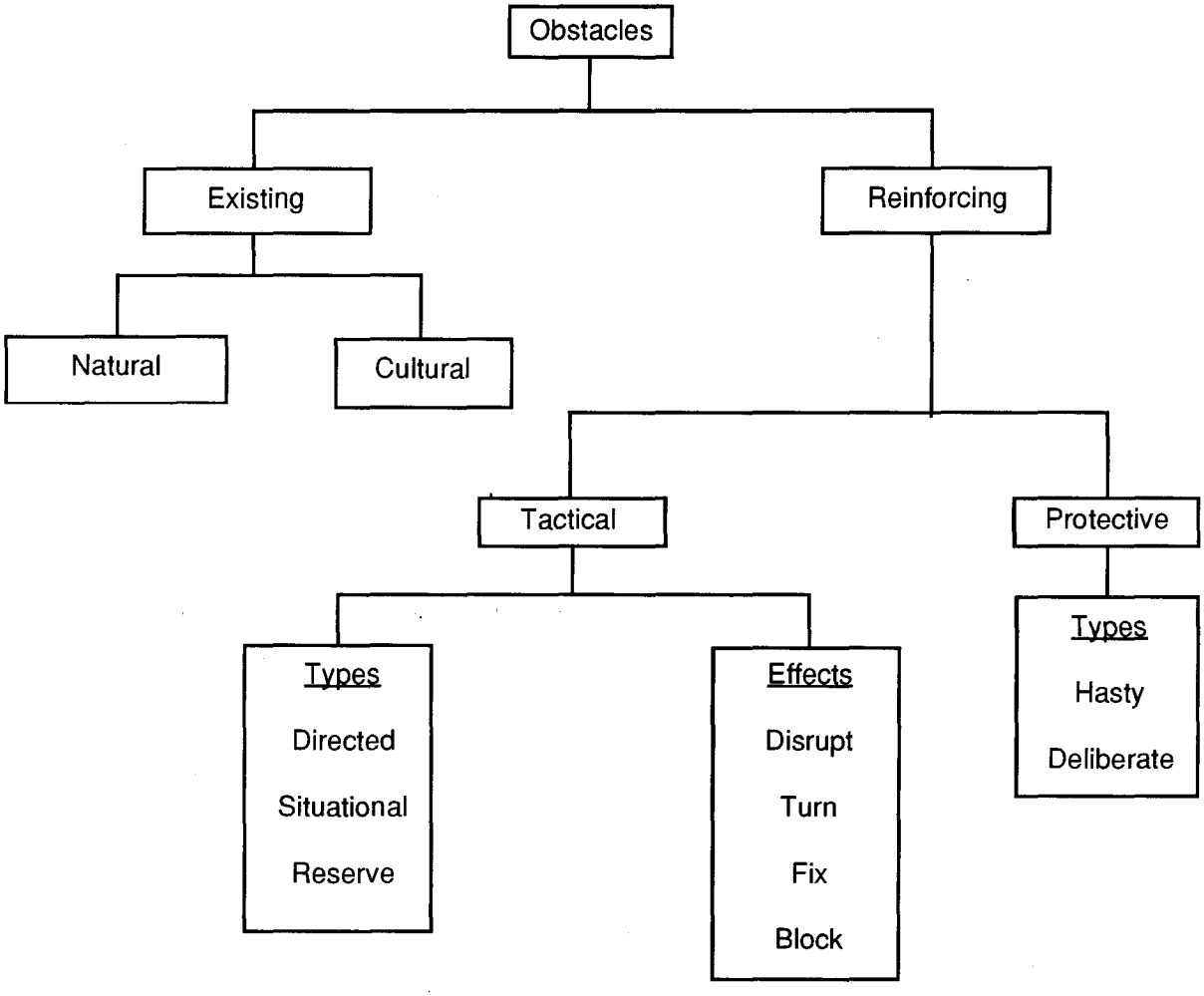


Figure 2-1. Obstacle classification.

Tactical obstacles directly attack the enemy's ability to move, mass, and reinforce. Commanders integrate these obstacles into the force's scheme of maneuver and direct- and indirect-fire plans to enhance the effects of friendly fires. The types of tactical obstacles are clearly distinguished by the differences in execution criteria. The three types are—

- Directed obstacles.
- Situational obstacles.
- Reserve obstacles.

Directed Obstacles. The higher commander directs these obstacles as specified tasks to a subordinate unit. Units plan, prepare, and execute directed obstacles during the preparation of the battlefield. Most tactical obstacles are directed obstacles, and most directed obstacles are planned at TF level. Chapter 5 provides details on planning directed obstacles in the context of TF obstacle planning, although the process is the same at any level.

Situational Obstacles. Situational obstacles are obstacles that units plan, and possibly prepare, before beginning an operation; however, they do not execute the obstacles unless specific criteria are met. Therefore, units may or may not execute

situational obstacles, depending on the situation that develops during the battle. They are "be prepared" obstacles and provide the commander flexibility for emplacing tactical obstacles based on battlefield development. Chapter 7 provides specific considerations for planning situational obstacles.

Reserve Obstacles. Reserve obstacles are obstacles for which the commander restricts execution authority. These are "on-order" obstacles. The commander usually specifies the unit responsible for emplacing, guarding, and executing the obstacle. Units normally plan and prepare reserve obstacles during preparation of the battlefield. They execute the obstacles only on command of the authorizing commander or based on specific criteria that the commander identifies. Chapter 6 provides specific considerations for planning reserve obstacles.

Tactical Obstacle Design. Units base tactical obstacle designs (width, depth, and composition) on the intended obstacle effect and formation of the attacker. They develop tactical obstacle designs to achieve one of four obstacle effects—disrupt, turn, fix, or block. Standard designs simplify obstacle resourcing, training, and effectiveness. See *Appendix A* for more information.

Protective Obstacles

Protective obstacles are a key component of survivability operations. Like final protection fires (FPF), protective obstacles provide the friendly force with close-in protection. The two types of protective obstacles are—

Hasty.
Deliberate.

Hasty Protective Obstacles. These are protective obstacles that are temporary in nature. Soldiers can rapidly emplace and recover or destroy them. Platoons and company teams employ hasty protective obstacles next to their positions to protect the defending force from the enemy's final assault (see *Figure 2-2).* Base commanders and base cluster commanders may emplace hasty protective obstacles to protect against all levels of threat in the rear area when sites are to be occupied temporarily.

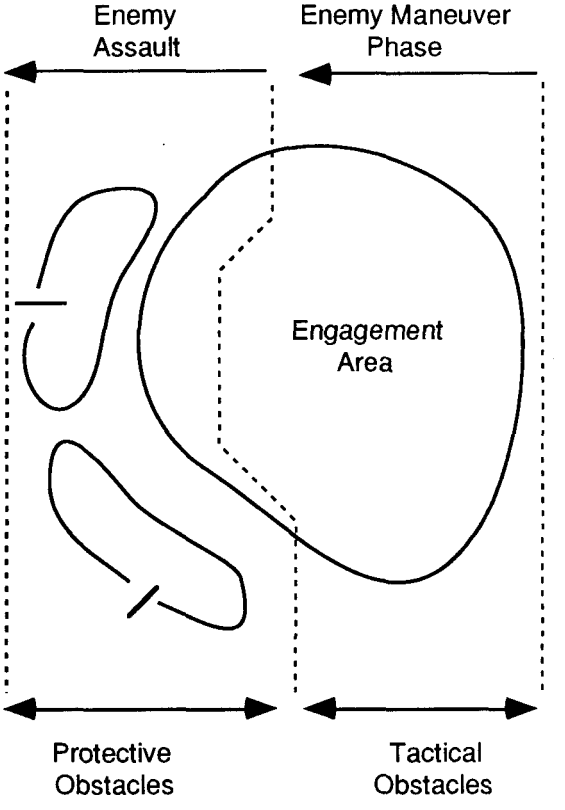


Figure 2-2. Tactical and protective obstacles.

Deliberate Protective Obstacles. These are protective obstacles that are more permanent and that require more detailed planning and usually more resources. Units employ deliberate protective obstacles in strongpoints or at relatively fixed sites. During operations other than war (OOTW), units emplace deliberate protective obstacles as part of their force protection plan.

Units base the composition of protective obstacles on analysis of the situational template. They design protective obstacles

against the most severe and the most likely close combat threat. Emplacing units remove protective obstacles—or turn them over to relieving units—before departing the area. A unit must report if it abandons protective obstacles due to tactical necessity. *Chapter 8* covers protective obstacles in greater detail.

OBSTACLE INTENT

Obstacle intent is how the commander wants to use tactical obstacles to support his scheme of maneuver. Obstacle intent consists of the following components:

- Target.
- Obstacle effect.
- Relative location.

TARGET

The target is the enemy force that the commander wants to affect with tactical obstacles. The commander usually identifies the target in terms of the size and type of enemy force, the echelon, the avenue of approach (AA), or a combination of these things.

OBSTACLE EFFECT

Tactical obstacles and fires manipulate the enemy in a way that supports the commander's intent and scheme of maneuver. The intended effect that the commander wants the obstacles and fires to have on the enemy is called the obstacle effect. The obstacle effect—

- Drives integration.
- Focuses subordinates' fires.
- Focuses obstacle effort.
- Multiplies the effects of firepower.

It is important to remember that obstacle effects occur because of fires and obstacles, not just obstacles alone. All tactical obstacles produce one of the following obstacle effects:

- Disrupt.
- Turn.
- Fix.
- Block.

Disrupt Effect

The disrupt effect focuses fire planning and obstacle effort to cause the enemy to break up its formation and tempo, interrupt its timetable, commit breaching assets prematurely, and piecemeal the attack. It also helps to deceive the enemy concerning the location of friendly defensive positions, to separate combat echelons, or to separate combat forces from their logistical support. *Figure 2-3* depicts a disrupt effect on an attacking battalion. To achieve a disrupt effect, normally the obstacles must attack half the enemy's AA. The obstacles should not require extensive resources. They should not be visible at long range but should be easily detected as the enemy nears them. Commanders normally use the disrupt effect forward of engagement areas (EAs).

Turn Effect

The turn effect integrates fire planning and obstacle effort to divert an enemy formation off one AA to an adjacent AA or into an EA. Its development requires well-defined mobility corridors (MCs) and AAs. *Figure 2-4, page 2-6,* depicts a turn effect on an attacking battalion. To achieve this effect, the obstacles have a subtle orientation relative to the enemy's approach. The obstacles and fires allow bypasses in the direction desired by the friendly scheme of maneuver. Obstacles at the start of the turn are visible and look more complex than those in the direction of the turn. Finally, the obstacles tie into impassable terrain at the initial point of the turn. Commanders normally use the turn effect on the flanks of an EA.

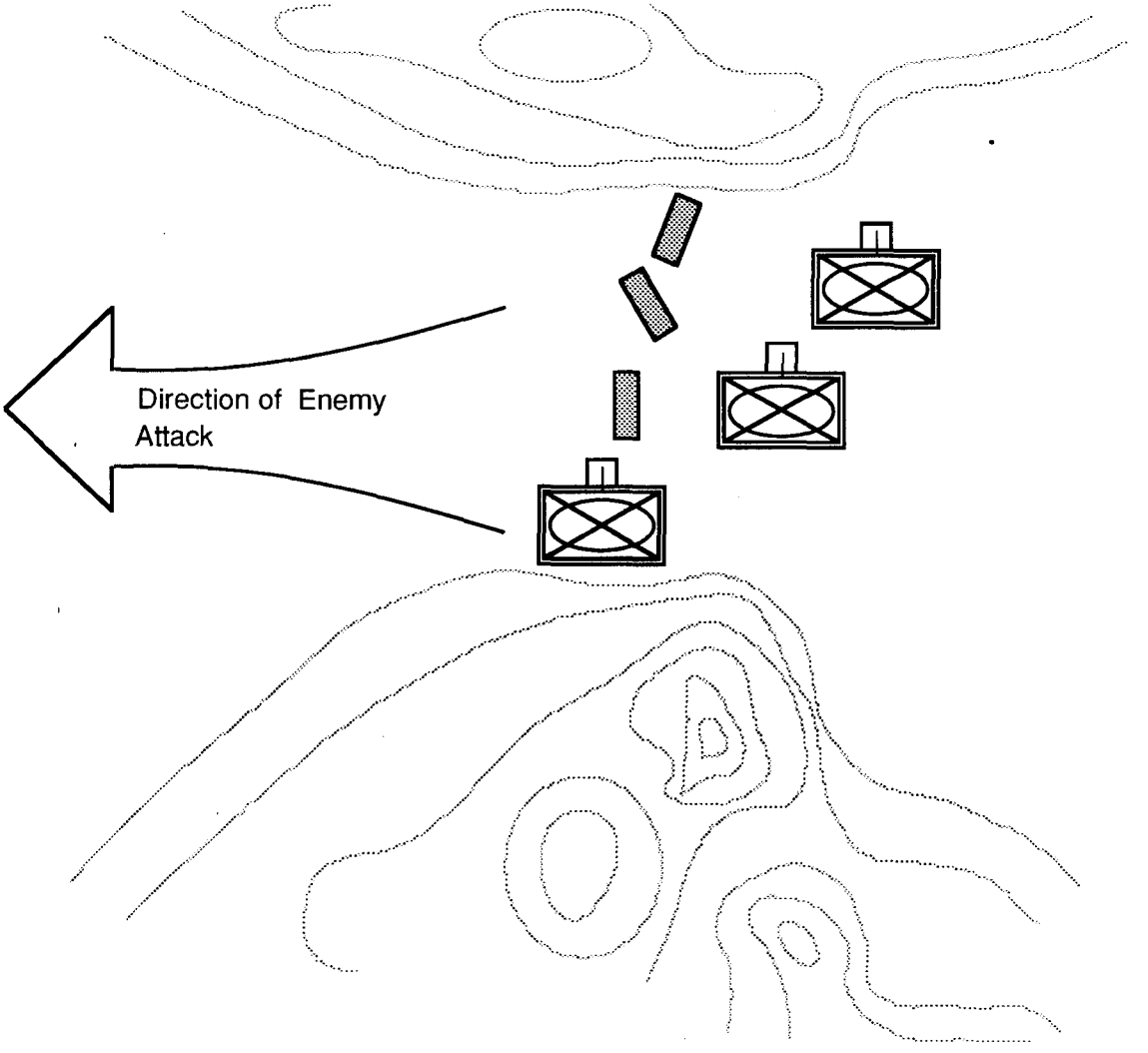


Figure 2-3. Disrupt obstacle effect.

Fix Effect

The fix effect focuses fire planning and obstacle effort to slow an attacker within a specified area, normally an EA. Primary use of this effect is to give the friendly unit time to acquire, target, and destroy the attacking enemy with direct and indirect fires throughout the depth of an EA or AA. The fix effect may generate the time necessary for the friendly force to break contact and disengage as the enemy maneuvers into the area. *Figure 2-5, page 2-7,* depicts a fix effect on an attacking battalion. To achieve the fix effect, units array obstacles in depth to cause the enemy formation to react and breach repeatedly. The obstacles must span the entire width of the AA, but they must not make the terrain impenetrable. The individual obstacles must look as if they could be easily bypassed or breached. A combination of obstacles that are clearly visible and others that are unseen (such as buried mines and obstacles on the reverse slope) help to confuse the enemy once it encounters the obstacles. Commanders normally use the fix effect inside the EA.

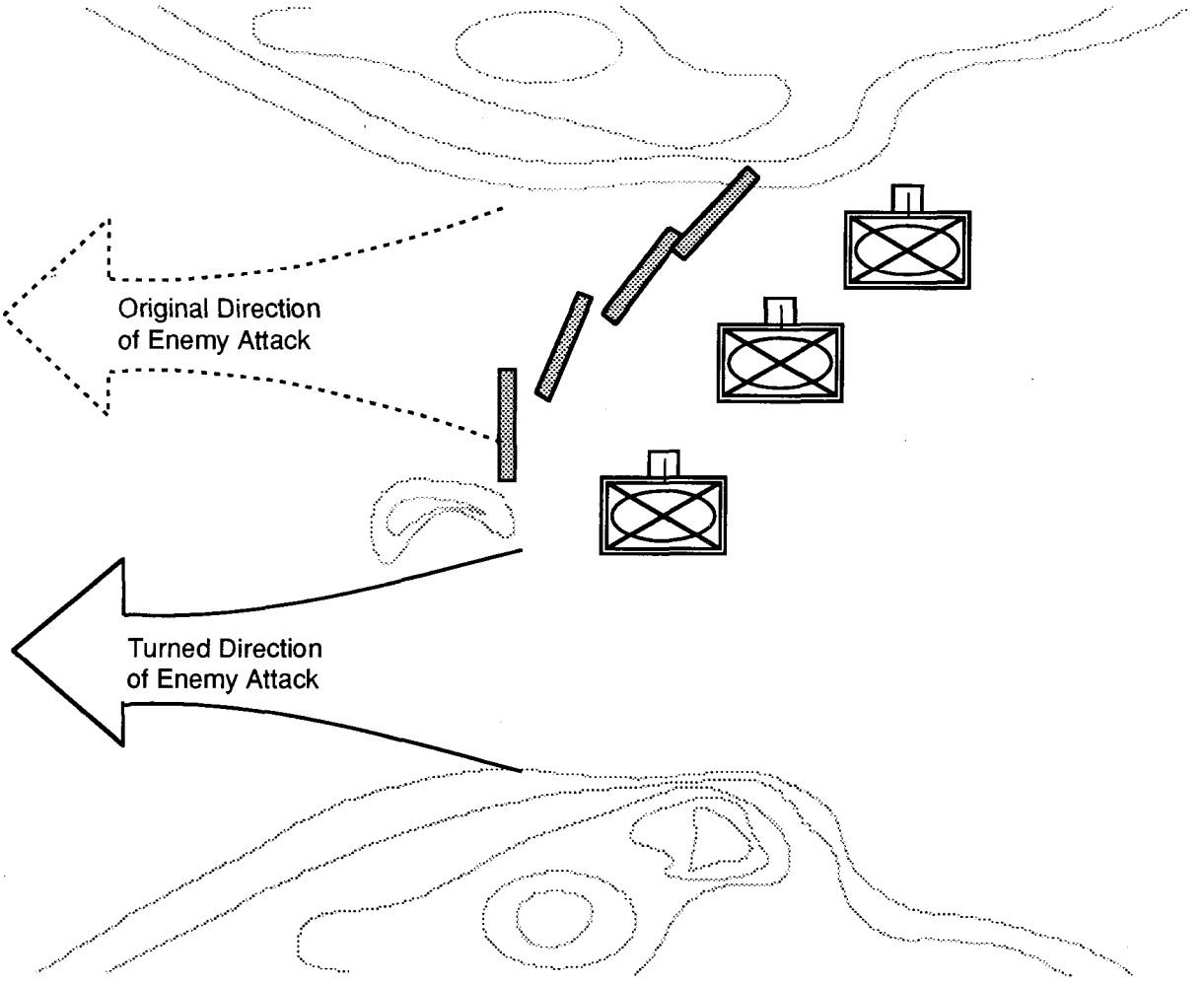


Figure 2-4. Turn obstacle effect.

NOTE: The fix effect is different from the maneuver action fix, which requires preventing the enemy from moving any part of its force from a specific location. Careful use of the term "fix effect" will prevent confusion.

Block Effect

The block effect integrates fire planning and obstacle effort to stop an attacker along a specific AA or prevent him from passing through an EA. *Figure 2-6, page 2-8,* depicts a block effect on an attacking battalion. To achieve the block effect, units integrate complex obstacles with intense fires to defeat the enemy's breaching effort. Complex obstacles are obstacles that require more than one breaching technique to breach the obstacle. Units array obstacles successively in a shallow area. When the enemy breaches one obstacle integrated with intense fires, it encounters another obstacle integrated with intense fires. Obstacles must defeat the enemy's mounted and dismounted breaching effort. They must span the entire width of the AA, allowing no bypass. Obstacles intended to stop the enemy along a specific AA should be readily visible to

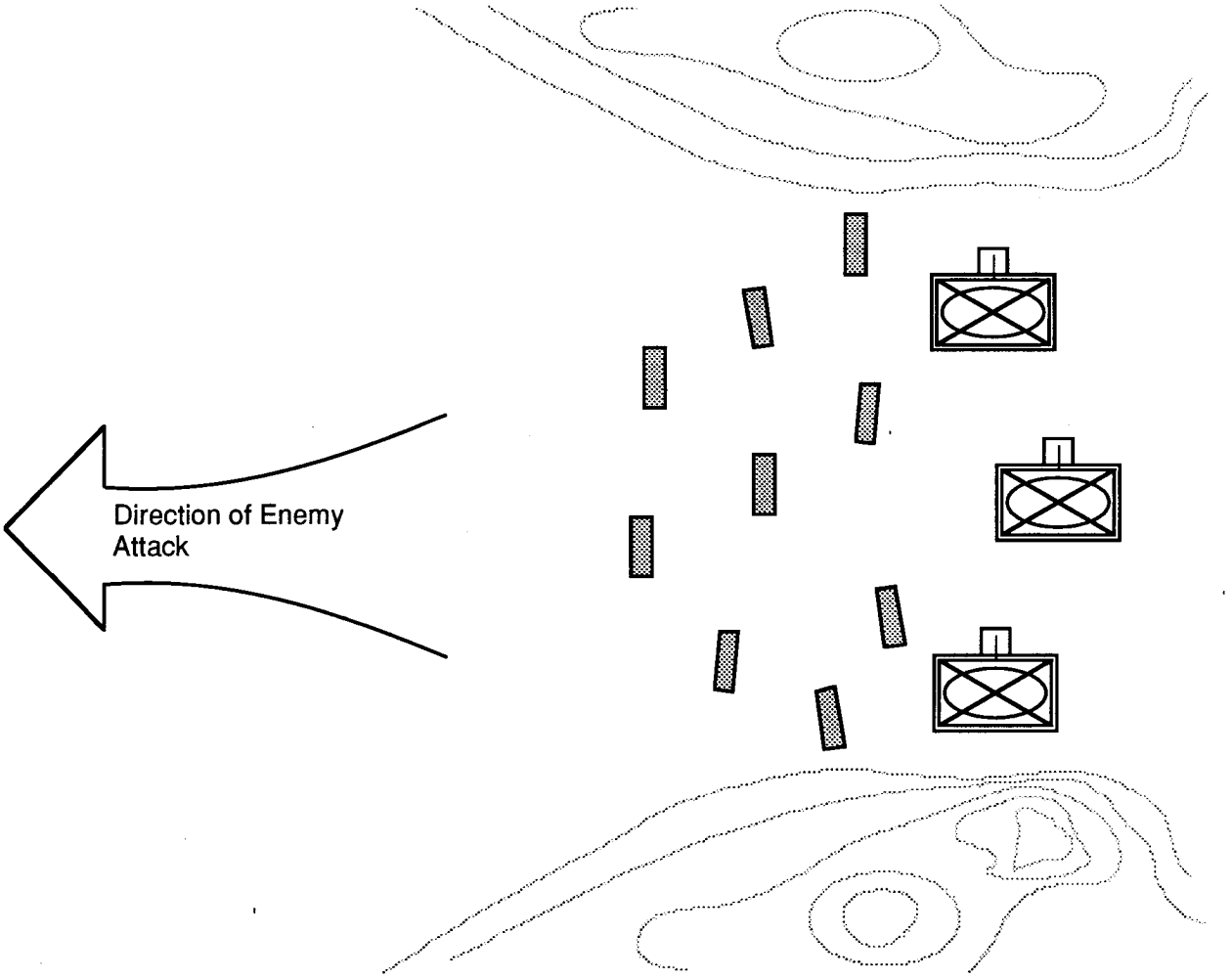


Figure 2-5. Fix obstacle effect.

discourage the enemy. Obstacles used to prevent an enemy from passing through an EA should not be as visible so that they do not discourage the enemy from entering the EA. The block effect is used in one of two instances. The first is to stop the enemy from using an AA and force it into another avenue that better supports the friendly scheme of maneuver. The second is to stop the enemy's forward movement and assist in the complete destruction of its force at the base of the EA.

Obstacle Effect Graphics

Commanders depict obstacle effects graphically. There is a separate graphic for each effect (see *Figure 2-7, page 2-9).* Commanders use obstacle effect graphics to convey the effect they want the obstacles to have on the enemy.

RELATIVE LOCATION

The relative location is where the commander wants the obstacle effect to affect

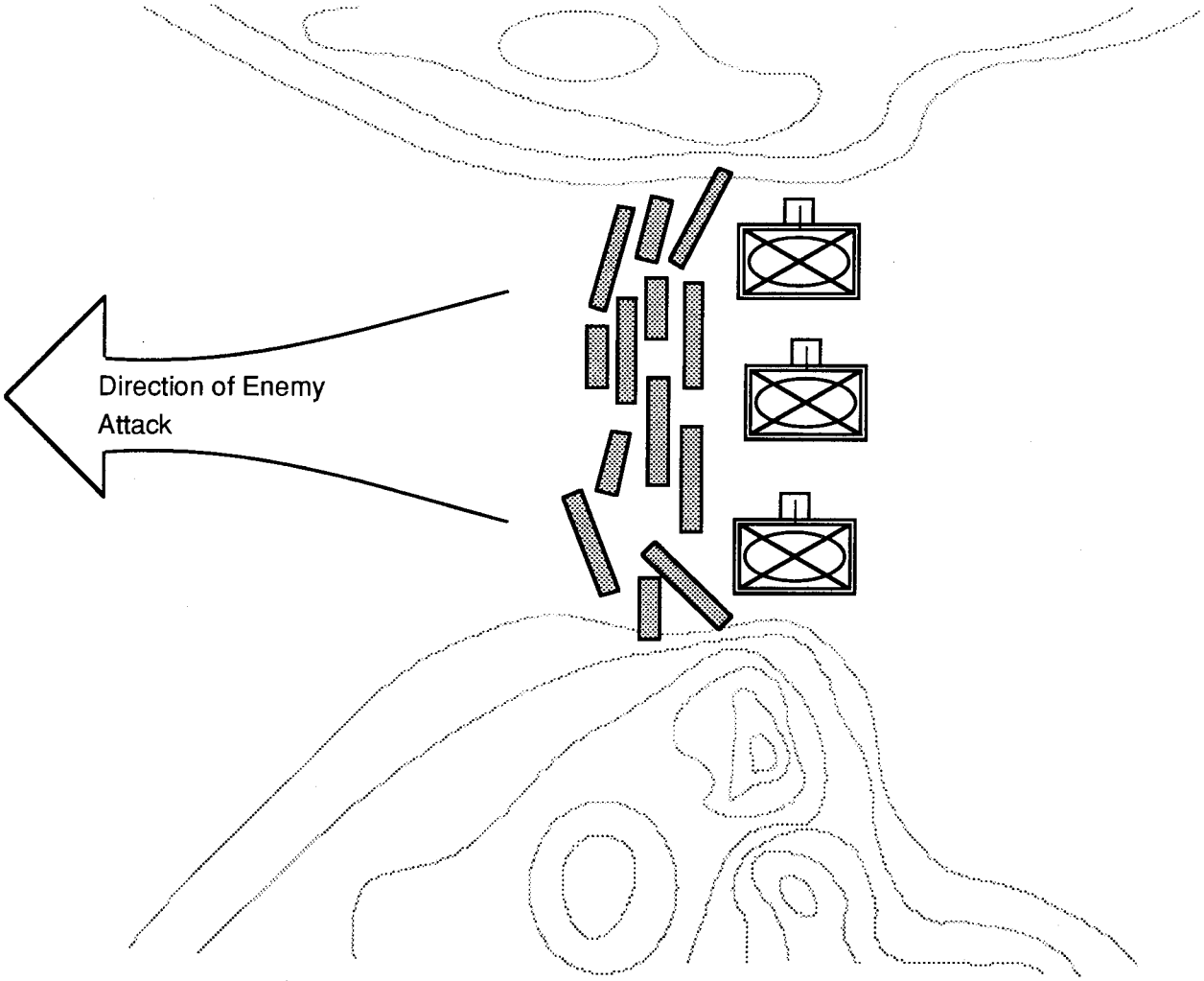


Figure 2-6. Block obstacle effect.

the target. Wherever possible, commanders give obstacle locations relative to maneuver or fire-control measures to integrate the effects of obstacles with fires.

OBSTACLE PROTECTION

Obstacle protection is protecting the integrity of obstacles. Both the emplacing unit (the unit that constructs the obstacle) and the owning unit (normally the company team responsible for siting the obstacle) play a role in obstacle protection. The following activities ensure obstacle protection:

- Conducting counterreconnaissance operations.
- Targeting and destroying breaching equipment.
- Repairing breached obstacles.
- Using phony obstacles.

COUNTERRECONNAISSANCE

Enemy reconnaissance operations begin well ahead of any planned operation. Friendly forces conduct counterreconnaissance to prevent the enemy from gathering information on friendly preparations.

Obstacle Effect Graphic	Application	Examples Conveying Intent
Disrupt	Short arrow indicates where enemy is attacked by obstacles. Long arrows indicate where bypass is allowed and attacked by fires.	
Turn	Heel of arrow is anchor point. Direction of arrow indicates desired direction of turn.	
Fix	Irregular part of arrow indicates where enemy advance is slowed by obstacles.	
Block	The ends of the vertical line indicate the limit of enemy advance. The ends of the vertical line also indicate where obstacles tie in to NO-GO terrain.	
		Direction of Enemy Attack

Figure 2-7. Obstacle effect graphics.

FMs 71-2 and 71-3 discuss counterreconnaissance operations in detail. The reconnaissance and surveillance (R&S) plan includes obstacle protection as part of the counterreconnaissance plan.

Establishing obstacle responsibility is critical to obstacle protection. Commanders must enforce obstacle ownership. Company teams use patrols and constant observation to ensure that the enemy does not conduct reconnaissance of friendly obstacles. This not only prevents the enemy from gaining detailed information but also prevents a small enemy force from covertly breaching the obstacle before its attack. *Figure 2-8, page 2-10,* depicts one company team's actions in conducting a patrol. A listening post/observation post (LP/OP) that maintains constant observation on the obstacle is also depicted. Other assets, such as ground surveillance radars (GSRs) or remote sensors, can aid in detecting infiltrating enemy forces that are attempting reconnaissance or a covert breach.

BREACHING ASSET DESTRUCTION

Once the battle begins, early identification and destruction of the enemy's breaching equipment, along with C2 vehicles, ensure maximum effectiveness of obstacles. Destroying a tank with an attached mine plow or roller reduces the enemy's

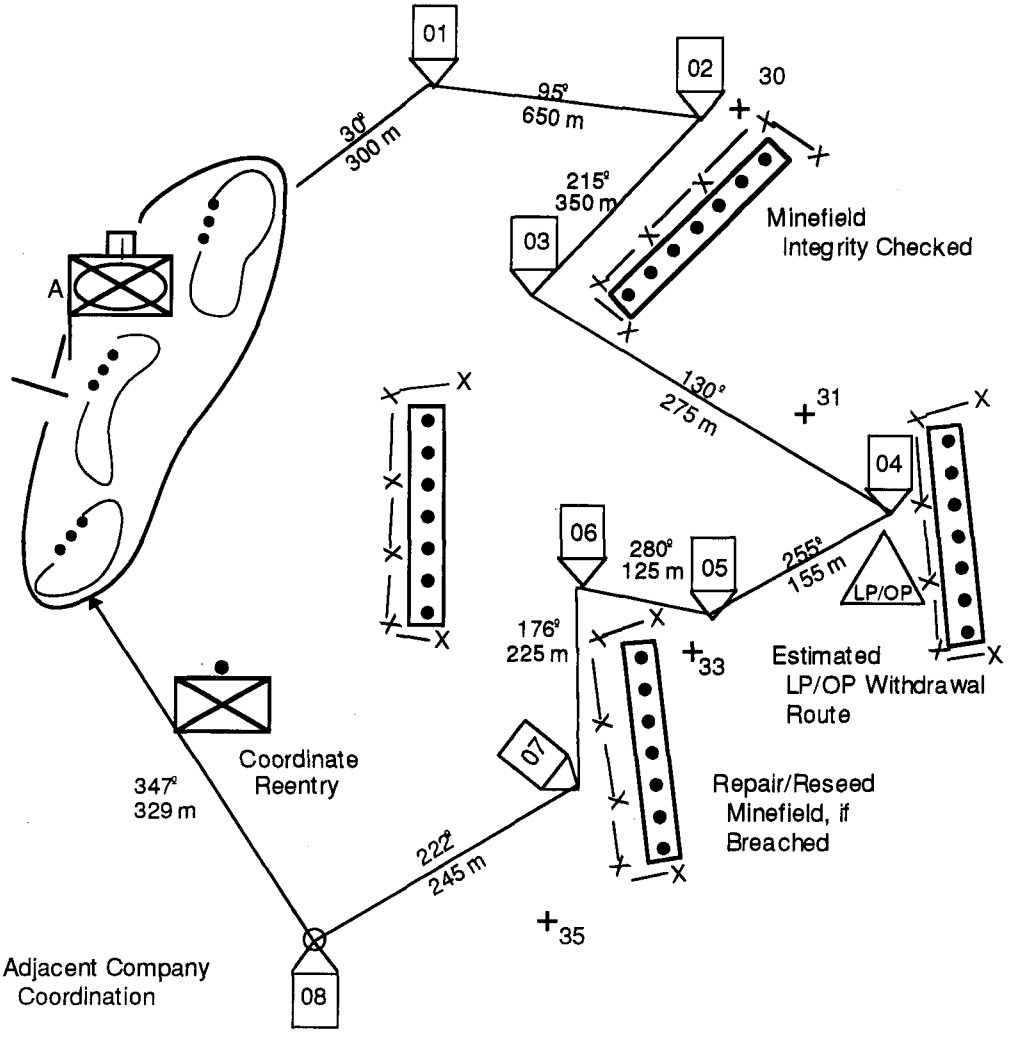


Figure 2-8. Obstacle protection.

breaching capability. This increases the time for the friendly force to engage and destroy other combat vehicles. Units identify high pay-off targets (HPTs) in the enemy's order of battle and establish priority of engagement by friendly weapon systems.

OBSTACLE REPAIR

As part of obstacle protection, the commander must plan for obstacle-repair contingencies. Obstacle repair must occur in the following instances:

- When a patrol detects enemy covert breach attempts in tactical obstacles.
- Between enemy echelons or during a lull in the battle.

Overmatching forces rely on quick repair methods, such as using modular pack mine systems (MOPMS) or hand emplacing two to three mines in the enemy's breaching lane. Units must plan, resource, and rehearse obstacle-repair contingencies.

PHONY OBSTACLES

Phony obstacles can support the complete obstacle protection plan. Examples include minefield marking where no minefield exists

or shallow excavations and berms that look like ADs. Phony obstacles serve to confuse enemy reconnaissance and breaching elements concerning the location of actual obstacles.

OBSTACLE COMMAND AND CONTROL

Obstacle C2 focuses on—

- Obstacle-emplacement authority.
- Obstacle control.

OBSTACLE-EMPLACEMENT AUTHORITY

Obstacle-emplacement authority is the authority that a unit commander has to emplace reinforcing obstacles. In a TO, theater commanders have the authority to emplace obstacles. In almost all cases, they delegate the authority to corps commanders who further delegate the authority to division commanders. Once this authority is granted, they have the authority in their area of operations (AO), unless the authority is subsequently withheld (or otherwise restricted) by a higher commander. Commanders subordinate to corps and divisions do not have the authority to emplace obstacles unless the higher commander gives them that authority for the current operation. Commanders use control measures and other specific guidance or orders to grant obstacle-emplacement authority to subordinate commanders. Higher commanders normally delegate the authority to emplace protective obstacles to the commanders of company teams, bases, or installations. Emplacement authority for the family of scatterable mines (FASCAM) depends on the particular system characteristics. Table 2-1 contains a detailed description of scatterable mine (SCATMINE) emplacement authority.

OBSTACLE CONTROL

Obstacle control is the control that commanders exercise to ensure that obstacles

Table 2- 1. SCATMINE-emplacement authority.

System Characteristics	Emplacement Authority
Ground- or artillery-delivered, with SD time greater than 24 hours	The corps commander may delegate emplacement authority to the division commander, who may further delegate authority to the brigade level.
Ground- or artillery-delivered, with SD time less than 24 hours	The corps commander may delegate emplacement authority to the division commander, who may delegate it to the brigade commander, who may further delegate it to the TF level.
Fixed-wing aircraft- (Air Force or Navy) delivered (Gator), regardless of SD time	Emplacement authority is normally retained at the division, corps, or theater command level, depending on who has air-tasking authority. The rules on SD times from above apply.
Helicopter-delivered (Volcano) regardless of SD time	Emplacement authority is normally delegated no lower than the commander who has command authority over the emplacing aircraft. The rules on SD times from above apply.
MOPMS, when used strictly for a protective minefield	Emplacement authority is usually granted to company team or base commander level. Commanders at higher levels restrict MOPMS use only as necessary to support their operations.

support current and future operations. Obstacle control ensures that subordinate commanders emplace obstacles to best support the higher commander's scheme of maneuver. Obstacle control also ensures that subordinate commanders do not emplace obstacles that will interfere with future operations. Commanders maintain obstacle control by—

- Focusing or withholding emplacement authority.
- Restricting types or locations of obstacles.

Commanders use control measures, specific guidance, and orders to maintain obstacle control.

Obstacle-Control Measures

Obstacle-control measures are specific control measures that simplify granting obstacle-emplacement authority and providing obstacle control. Table 2-2 summarizes some considerations for use of obstacle-control measures. Figure 2-9 shows the obstacle-control- measure graphics. Chapter 3 covers the use of obstacle-control measures to support obstacle integration. Obstacle-control measures are—

- Zones.
- Belts.
- Groups.
- Restrictions.

Obstacle Zones. Obstacle zones are a graphic control measure that corps and division commanders use to grant obstacle-emplacement authority to brigades (including armored cavalry regiments (ACR) and other major subordinate units). Corps and division commanders also use zones to

Table 2-2. Obstacle-control measures.

Obstacle-Control Measure	Echelon	Specific Obstacle Effect	Size of Enemy Avenue of Approach/Mobility Corridor	
			Armored	Light
Zone	Division Corps	Optional, not Normal	Division/ Brigade	Brigade/ Battalion
Belt	Brigade	Optional, but Normal	Brigade/ Battalion	Battalion/ Company
Group	Task Force Brigade Division Corps	Mandatory	Battalion/ Company	Company/ Platoon
Restrictions	Corps Division Brigade Task Force	Not Applicable	Not Applicable	Not Applicable

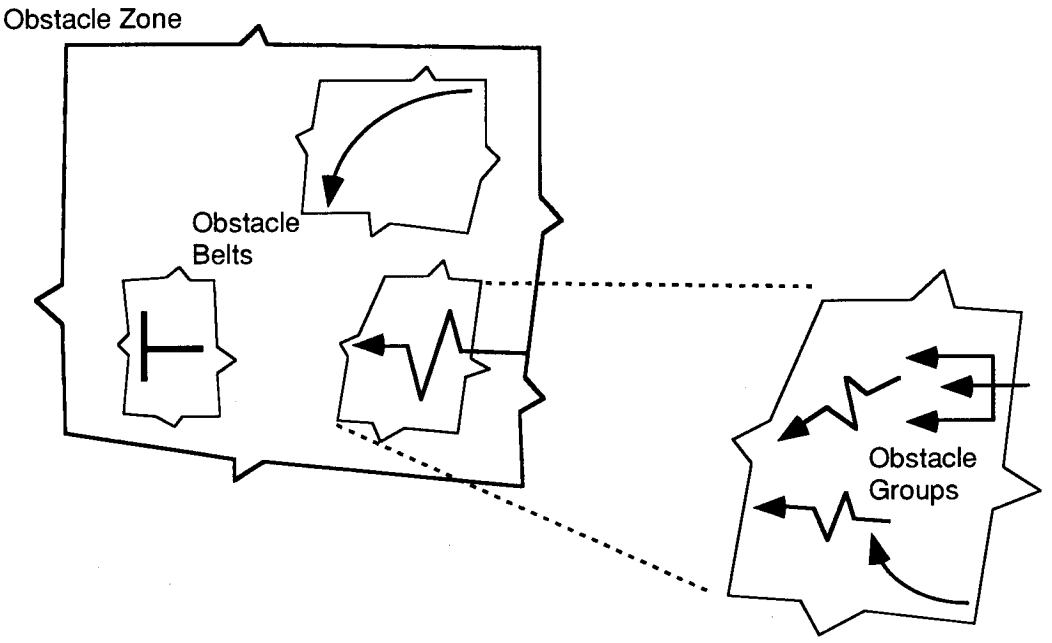


Figure 2-9. Obstacle-control-measure graphics.

ensure that subordinates emplace obstacles that support the higher commander's scheme of maneuver and that do not interfere with future operations. *Chapter 4* covers the use of obstacle zones for obstacle planning.

Corps and divisions plan obstacle zones based on brigade AOs. When defending against an enemy of similar composition and capability, they align brigades and zones with enemy division AAs as defined by regimental MCs. However, a light division defending against a mechanized enemy may plan obstacle zones based on enemy regimental AAs as defined by battalion-size MCs. In the offense, zone planning is more flexible. Corps and divisions still align obstacle zones with areas for which brigades are responsible. In any case, if the obstacle zone encompasses the entire brigade sector, another graphic is unnecessary. Commanders may designate the entire sector as an obstacle zone, with the unit boundaries defining the geographical limits of the zone.

Obstacle zones do not cross brigade boundaries. Commanders assign zones to a single subordinate unit to ensure unity of effort, just as they would defensive sectors or battle positions (BPs). This keeps tactical obstacle responsibility along the same lines as control of direct and indirect fires. This does not normally create a vulnerability on the boundary between units since commanders base both sectors and obstacle zones on defined AAs.

Adjacent brigades may rarely cover the same AA, but obstacle zones still do not cross unit boundaries. Commanders give adjacent brigades obstacle zones that meet along their boundaries. To ensure unity of obstacle effort, the commander designates a contact point for obstacle coordination between the adjacent brigades. The division commander also may assign more than one zone to a unit. This technique is useful when the commander wants to constrain tactical obstacle employment to two or more specific areas, leaving the remainder free for division maneuver.

Commanders can assign an obstacle intent to an obstacle zone, but they normally do not. Although the target (normally an enemy division) and relative location (the area of the zone) are apparent, commanders normally do not specify an obstacle effect for a zone. This allows the subordinate commander flexibility in using obstacles. Establishing zone priorities helps identify the division obstacle main effort to subordinates.

Obstacle zones also assist the corps or division staff to resource and plan obstacle logistics throughput to the brigades. Staffs resource obstacle zones by anticipating how the brigades will use obstacles based on their assigned mission, intelligence preparation of the battlefield (IPB), task organization, and division commander's intent. *Appendix C* contains a detailed discussion of obstacle resourcing and supply.

Obstacle Belts. Obstacle belts are the graphic control measure that brigade commanders use to constrain tactical obstacle employment. They plan obstacle belts within assigned obstacle zones to grant obstacle-emplacement authority to their major subordinate units. Obstacle belts also focus obstacles in support of the brigade scheme of maneuver and ensure that obstacles do not interfere with the maneuver of any higher HQ *Chapter 4* contains a detailed discussion of the use of obstacle belts for obstacle planning.

Brigade commanders use obstacle belts to attack the maneuver of enemy regiments (or enemy brigade-size units). They plan and allocate belts against regimental AAs based on battalion MCs. This is consistent with brigade planning, which allocates companies against battalion MCs and task organizes TFs to defeat enemy regiments. As with obstacle zones, light units defending against mechanized forces focus obstacle belts one echelon down.

For the same reasons as discussed in obstacle zones, obstacle belts do not cross unit boundaries. A single unit is responsible for a belt; however, commanders may assign more than one belt to a unit. TF commanders cannot plan or emplace obstacles outside brigade-directed obstacle belts. Commanders use the same techniques as for obstacle zones to ensure coordination along unit boundaries and may designate entire TF sectors as obstacle belts.

Brigade commanders normally assign an obstacle intent to each obstacle belt. As with the obstacle zone, the target and relative location are apparent. The addition of a specific obstacle effect gives purpose and direction to TF obstacle planning. When brigade commanders assign an obstacle effect, they ensure that obstacles within the belt complement the brigade fire plan. The combination of obstacle belts with specific effects is the commander's obstacle intent. It conveys the effect that must be achieved by fires and obstacles (obstacle effect) against a specific enemy (target) within the defined belt (relative location) to his TF commanders.

Obstacle belts refine the area authorized for tactical obstacles; however, they still give TF commanders the latitude they need to develop detailed obstacle plans based on direct-fire planning. The brigade commander's obstacle intent is descriptive rather than prescriptive. Assigning a specific obstacle effect to a belt does not prevent TF commanders from employing the full range of tactical obstacle effects within the belt; however, the combined effect must achieve the assigned intent of the belt.

Obstacle belts are also critical tools in resourcing and planning obstacle logistics. There are two key components to logistically sustaining the obstacle effort:

- The commander and staff must resource the belt with the material, manpower, and time required to emplace the obstacles to meet the intent.

- The brigade must develop a plan for getting the necessary resources to the right place, in the right amount, and in sufficient time.

Obstacle belts help the staff to identify requirements and plan transportation. *Appendix C* contains a more detailed description of belt resourcing and supply.

NOTE: The commander at corps, division, or brigade level may authorize emplacement authority for certain types of protective obstacles outside of obstacle zones or belts. Normally, the commander will authorize company team and base commanders to emplace protective obstacles within 500 meters of their positions (mission, enemy, troops, terrain, and time available (METT-T) dependent). The commander usually limits the types of obstacles that a unit may use for protective obstacles that are outside of obstacle-control measures (for example, allowing only wire and antipersonnel (AP) mines outside of control measures for protective obstacles and requiring that minefield be fenced on all sides to prevent fratricide).

Obstacle Groups. Obstacle groups are one or more individual obstacles grouped to provide a specific obstacle effect. TFs use obstacle groups to ensure that company teams emplace individual obstacles that support the TF scheme of maneuver. In rare cases, brigades, divisions, or even corps may use obstacle groups for specific tactical obstacles. Also, units integrate obstacle groups with direct- and indirect-fire plans in detail.

Obstacle groups usually attack the maneuver of enemy battalions. Normally, commanders plan obstacle groups along enemy battalion AAs as defined by company MCs. They may plan a group along a company-size AA. This is especially true for friendly light forces. Unlike obstacle zones or belts, obstacle groups are not areas but are relative locations for actual obstacles. Commanders normally show obstacle groups using the obstacle effect graphics. When detailed planning is possible (to include detailed on-the-ground reconnaissance), commanders may show obstacle groups using individual obstacle graphics. *Chapter 5* contains a detailed discussion of the use of obstacle groups in obstacle planning.

Commanders can plan obstacle groups within the limits of their obstacle-emplacement authority. Corps and division commanders can plan obstacle groups anywhere in their AOs. Brigade and TF commanders can plan them anywhere in their obstacle zones or belts, respectively. Because of the requirement for detailed integration with the fire plan, very few obstacle groups are planned above TF level. Unless solely integrated with indirect fires, obstacle groups planned at corps, division, or brigade level ultimately are integrated with fire at the TF level. When given a belt with an assigned intent, the TF commander can use any combination of group effects if the sum effect of all groups achieves the belt intent.

Obstacle groups impose strict limitations on company team commanders to preserve the link between obstacle effects and the fire plan. The limitations are similar to the limitations imposed by a BP. A group does not give the exact location of obstacles in the group just as a BP does not show the exact location of each weapon in the company team. The company team commander and the emplacing unit leader, usually an engineer, coordinate these details directly.

The company team commander and the engineer can adjust obstacles in the group if the intent and link to the fire plan remain intact. Company team commanders make minor changes to obstacles and fire-control measures based on the reality of the terrain. For example, a commander may

move a fixing obstacle group and direct-fire target reference points (TRPs) a few hundred meters to avoid having them masked by rolling terrain. A major change to the obstacle-group location requires the approval of the commander who ordered the obstacle group emplacement.

Obstacle-ADgroup responsibility falls along the same lines as fire control. Normally, company team fire plans are relatively simple, massing the company team's fires on a single AA at a time. Simplicity is essential in ensuring that company team commanders can focus their C2 on maximizing the effects of the obstacle group. A TF should not assign a company team more than two obstacle groups; however, it can effectively fight only one group at a time. To mass fires on an obstacle group, more than one company team will often cover a single obstacle group. In these cases, the commander who is responsible for establishing the EA is also in charge of integrating the obstacle group. Normally, the TF commander or Operations and Training Officer (US Army) (S3) plays a significant role in building and synchronizing an EA covered by two or more companies.

Obstacle groups, resource factors, and standard individual obstacles are the basis of TF obstacle logistics planning. They enable the commander and staff to allocate the necessary resources to each obstacle group, EA, or company team BP. These tools also enable the staff to identify critical shortfalls, plan the flow of materials within the TF area, and schedule resupply, *Appendix C* addresses obstacle resourcing in detail.

Obstacle Restrictions. Commanders at all levels may use obstacle restrictions to provide additional obstacle control. Commanders may use obstacle restrictions to limit the specific types of obstacles used (for example, no buried mines or no SCATMINEs). These restrictions ensure that subordinates do not use obstacles with characteristics that impair future operations. It also allows commanders to focus the use of limited resources for the main effort by restricting their use elsewhere. Commanders also may use restrictions to prevent subordinates from emplacing obstacles in a certain area. This type of restriction may be shown graphically as an obstacle restricted area.

Units also may indicate this type of restriction in the operation order (OPORD). For example, the order may state that there will be no obstacles along a designated main supply route (MSR) or no demolition of a certain bridge. This type of restriction also may be implied. For example, a planned corps counterattack (CATK) axis implies to the division that the axis is an obstacle restricted area. Subordinate commanders have the right to be more restrictive than the higher commander; however, the subordinate commander cannot relax the higher commander's restrictions.

Obstacle Numbers

Obstacle zones, belts, and groups are labeled with alphanumeric designators. An obstacle number is a twelve-character designator that is given to each individual obstacle. The first four characters designate the HQ that ordered the obstacle zone. The next three characters are a letter for the obstacle zone, a number for the obstacle belt, and another letter for the obstacle group. The next two characters are an abbreviation of the individual obstacle type. This is followed by a two-digit number indicating the number of the individual obstacle in the group. The last character is a status code. *Appendix B* contains a detailed explanation of the use of the alphanumeric designator in the obstacle reporting and recording system.

The terms and definitions used in this chapter lay the groundwork for understanding the remainder of this manual. The following chapters explain obstacle integration and planning.

Chapter 3

Obstacle-Integration Principles

Obstacle integration is the process of ensuring that the obstacle effects support the scheme of maneuver. Obstacle integration cuts across all functional areas and all echelons. An understanding of the basic principles behind obstacle integration is essential for commanders and staffs at all levels. These principles are the cornerstone for obstacle planning discussed in *Chapters 4 and 5.*

Commanders and staffs consider the following to ensure that obstacles have the desired impact on the battle:

- Intelligence.
- Obstacle intent.
- Fires and obstacle effects.
- Obstacles and operations in depth.
- Obstacle control.
- Echelons of obstacle planning.

INTELLIGENCE

Battlefield success depends largely on the ability of the commander to see the battlefield. He identifies enemy vulnerabilities and how the enemy may use the existing terrain to gain an advantage. The maneuver commander does this through the IPB process *(FM 34-130* covers the IPB process in detail). The IPB integrates enemy doctrine with the terrain and weather, mission, and current battlefield situation. The IPB process helps the commander to—

- Decide where to kill the enemy.
- Define the decisive point based on the terrain, enemy doctrine, and vulnerabilities.

Key steps in the IPB process are to—

- Analyze the terrain.
- Determine enemy force size.
- Determine enemy vulnerability.

ANALYZE THE TERRAIN

Staffs conduct terrain analysis based on the five military aspects of terrain: observation and fields of fire, cover and concealment, obstacles, key terrain, and avenues of approach (OCOKA). The obstacles in OCOKA are normally existing obstacles; however, reinforcing obstacles from previous military operations may be present in some situations. The identification of MCs and AAs helps the commander to decide where the enemy can maneuver and to identify any limitations on friendly maneuver.

DETERMINE ENEMY FORCE SIZE

The next step is to determine the size of the enemy force that each AA can support. The primary reason for determining the size of the enemy force is to allocate friendly forces. An important consideration is to identify any terrain that may cause the enemy to change formation.

DETERMINE ENEMY VULNERABILITY

In the last step, the commander and staff consider where the enemy is vulnerable. Attacking the enemy at the point of vulnerability with fires and obstacles can lead to a decisive victory. Also, obstacles should be designed against an enemy's breaching vulnerability. If some types of obstacles can be easily breached by the enemy, using those obstacles to shape the battlefield may be ineffective.

OBSTACLE INTENT

The commander decides how he wants to use obstacles to support his scheme of maneuver. He defines the end result that fires and obstacles must achieve. His obstacle intent provides purpose and unity of effort to the obstacles emplaced by subordinates. At TF level and normally at brigade level, obstacle intent identifies the following:

- Target.
- Obstacle effect.
- Relative location.

TARGET

Obstacles are a force-oriented combat multiplier. Subordinates must understand the target of the obstacles so that they can properly design and site obstacles.

OBSTACLE EFFECT

Subordinates must know the commander's desired obstacle effect: disrupt, turn, fix, or block. This provides a common expectation of the effect that the commander wants their fires and obstacles to have on enemy maneuver.

RELATIVE LOCATION

Obstacle location is a vital component of obstacle intent since it ties the obstacle effect and target to the scheme of maneuver. Subordinates must understand the relative location of obstacles to ensure that the desired effect occurs at the right place. Commanders establish their obstacle intent concurrent with organizing and developing the fire plan or scheme of maneuver. Each component of obstacle intent directly influences the fire plan or scheme of maneuver. Obstacle planning does not drive fire planning or the scheme of maneuver. Subordinates plan, adjust, and execute obstacles and fire- and maneuver-control measures to meet the commander's obstacle intent.

Figure 3-1 illustrates the impact that obstacle intent can have on adjusting fire-control measures at the TF level. The TF commander assigns Team A to occupy and defend BP 10 oriented in EA Blue on TRPs 01 and 02. The commander intends to use the obstacles and fires in EA Blue to turn an enemy battalion to the south. To mass fires at the initial turning point, the TF commander adds TRP 03. The company team commander must first mass all fires between TRPs 01 and 03. Once the enemy force begins turning, the commander will shift some or all fires between TRPs 02 and 03.

FIRES AND OBSTACLE EFFECT

All leaders (from TF commander to squad leader) must understand how obstacles and fires mesh to achieve the obstacle effect. This enables them to maximize the effectiveness of available fires and obstacles, exploit

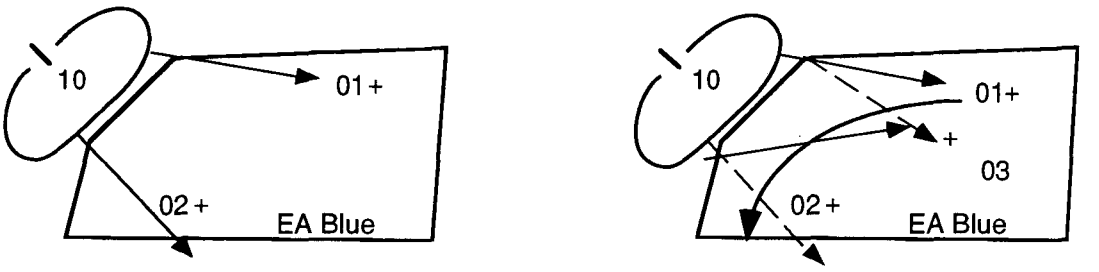


Figure 3-1. Impact of obstacle intent on fire control.

the weaknesses they create in the enemy, and defeat the enemy attack. Fire control requires that named areas of interest (NAIs), targeted areas of interst (TAIs), and TRPs synchronize indirect fires with direct fires and obstacles.

FIRES AND DISRUPT EFFECT

Commanders use the disrupt effect to cause an enemy to—

- Break up his formation and tempo.
- Interrupt his timetable.
- Commit breaching assets prematurely.
- Piecemeal his attack.

The disrupt effect also helps to deceive the enemy concerning the location of friendly defensive positions, separate combat echelons, or separate combat forces from their logistical support. To accomplish the disrupt effect, the obstacles and fires must—

- Cause the enemy to deploy early.
- Slow and disrupt part of the enemy force.
- Allow part of the enemy force to advance unimpeded.

Commanders use indirect fires and long-range direct fires to force the enemy to change from a march formation to a prebattle or attack formation. Generally, indirect fires alone will not force an enemy to deploy except when he is dismounted.

Commanders plan suppression and neutralization indirect-fire targets (or groups) on the obstacles in the disrupt obstacle group. They use indirect fires with the obstacles to slow the part of the enemy force that makes contact with the obstacles. Commanders also use every means available to disrupt enemy C2 throughout the enemy formation. Commanders use electronic warfare (EW), smoke, and indirect fires to disrupt the enemy's decision cycle and increase the direct-fire window on the unimpeded part of the enemy force.

Commanders use TRPs to mass direct fires against that part of the enemy formation not impeded by obstacles and indirect fires. They do not execute those fires until the force separates from its parent formation. They use direct-fire weapons that can deliver a lethal initial volley of fire. A quick volley is critical if the enemy has good C2 and can react quickly to the disruption of its formation. Disengagement criteria are also a consideration in weapons selection. If commanders plan a short engagement, they choose a weapon system that can fire and maneuver without becoming decisively engaged. If they expect a long engagement, they select a weapon system that can sustain rapid fire with sufficient survivability to support the engagement.

Commanders plan fire-control measures that allow for the shift of direct or indirect fires to the enemy slowed by the obstacle or to the enemy bypassing the obstacle. They position themselves to make an assessment of the obstacle effect. If the enemy is rapidly breaching the obstacles, they may shift

direct fires against the enemy's breaching assets. On the other hand, if too large a force bypasses, commanders may shift all fires against the unimpeded enemy to inflict maximum losses and then reposition friendly forces to their subsequent positions.

Figure 3-2 illustrates the integration of fires with obstacles to achieve a disrupt effect. In this example, the TF commander assigns Team D to defend BP 14 oriented in EA Red to disrupt the lead enemy battalion forward of the TF EA. Team D will then reposition to a subsequent BP to help in the fight in the TF EA. Team D is a balanced company team with one armor platoon, one mechanized infantry platoon, and an armor company HQ. Fire-control measures include TRPs 03 and 04 forward of the obstacle group and TRPs 01 and 02 south of the obstacle group. The TF commander orders the TF fire support officer (FSO) to plan artillery group AIB as a suppression mission to cover the disrupt obstacle group. The FSO assigns the Team D fire support team (FIST) the responsibility for execution of A1B.

As the attacking enemy approaches the obstacle group, the company team commander orders the mechanized platoon to engage using the Bradley fighting vehicles' (BFV's) tube-launched, optically tracked, wire-guided (TOW) missiles between TRPs 03 and 04. The commander uses indirect fires with the long-range TOW fires, which causes the enemy to button up and deploy into prebattle formation.

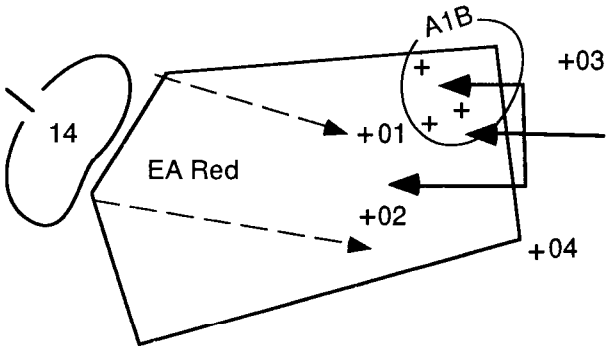


Figure 3-2. Fires and disrupt effect.

The commander orders the company team FIST to execute group A1B to coincide with the enemy's encounter with the obstacles in the obstacle group. Group A1B includes dual-purpose improved conventional munitions (DPICM) and smoke. The combination of fires, smoke, and obstacles slows the northern half of the enemy. As the enemy loses C2 over its formation, the southern half of the enemy separates from the remainder of the battalion and continues forward.

As the southern half of the enemy formation reaches the line defined by TRPs 01 and 02, the company team commander masses all direct fires on the lead enemy vehicles. The company team commander uses volley fires to destroy the southern half of the enemy battalion. He then shifts all direct fires to the remainder of the enemy force, fires one volley, and repositions to his subsequent BP.

FIRES AND TURN EFFECT

Commanders use the turn effect to integrate fires and obstacles to divert an enemy formation off one AA to an adjacent AA or into an EA. To accomplish the turn effect, the obstacles and fires must—

- Prevent the enemy from bypassing or breaching at the start of the turn.
- Force the enemy to bypass in the desired direction.
- Maintain pressure on the enemy throughout the turn and exploit its exposed flank.

Commanders normally anchor turning obstacle groups to restrictive terrain or to a strongpoint. They plan fire-control measures that focus all available fires first at the anchor point. When the enemy hits the obstacle, the combination of fires, obstacles,

terrain, and forces must seal any bypass at the anchor point.

Commanders plan an indirect-fire target or group to turn the enemy away from the anchor point. They focus enough direct-fire assets to deal with the size of the enemy force expected at that point. For example, if a commander expects an enemy company at the anchor point, he should allocate at least a friendly platoon to mass fires at that point. If the enemy breaches the obstacle at the anchor point, the turning effect could be lost. This could unhinge the entire operation.

The critical task in achieving the turn effect is to use obstacles and overwhelming fires to force the enemy to move in the direction desired by the friendly commander. As the engagement progresses, the friendly force stops any attempt to breach the obstacle and makes breaching assets priority targets. Direct-fire systems are the primary means for destroying enemy breaching equipment. Indirect fires can attack individual targets, but they may be less timely. Targeting all obstacles in the obstacle group and registering TRPs during preparation will make indirect fires more responsive.

Commanders develop a fire plan and fire-control measures that allow them to shift fires as necessary to cover the turn effect. Both direct and indirect fires shift in unison to attack and maintain pressure on the flank of the enemy force. Fires covering the length of the turn effect are less focused than at the turn point. Company team commanders give platoons sectors of fire between TRPs. Commanders usually execute indirect fires in groups instead of aiming at individual targets. Direct and indirect fires continue throughout the length and depth of the turn effect. These fires simultaneously exploit the vulnerability created by the turn effect and protect the integrity of the obstacles:

Figure 3-3 illustrates how a unit can integrate direct and indirect fires with obstacles to achieve the turn effect. In this example, the TF commander assigns Team C the

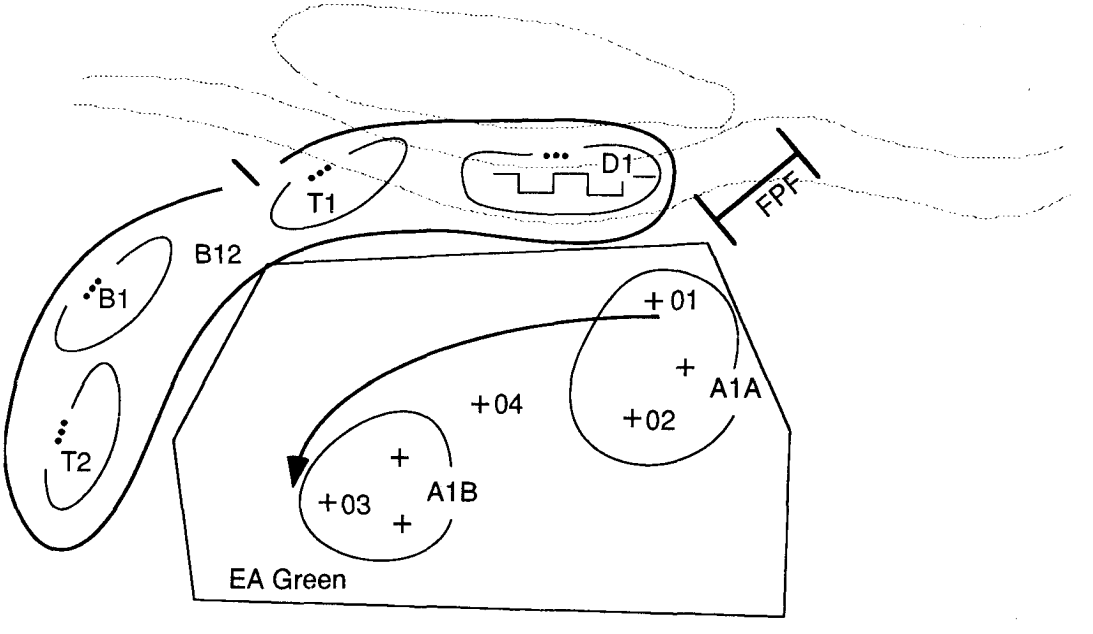


Figure 3-3. Fires and turn effect.

mission to defend BP 12 oriented in EA Green to turn the enemy into the main TF EA to the south. Team C is a tank-heavy company team with two armor platoons—a mechanized infantry platoon and an armor company HQ. The company team commander positions one tank platoon each in BPs T1 and T2. He separates the mechanized platoon into a mounted element in BP B1 and a dismounted element in BP D1. The commander has tied the anchor point of the turning obstacles into restricted terrain and the dismounted infantry position. Fire-control measures include TRPs 01 and 02 to focus fires on the turning point and TRPs 03 and 04 to cover the length of the turn effect. The TF commander allocates artillery group A1A as a destroy mission to cover the anchor point and group A1B as a neutralize group to support the turn effect. He also allocates one mortar FPF that the company team commander uses to protect the flank of BP D1. The company team commander gives the dismounted-element forward observer (FO) the primary responsibility for firing A1A and the FPF. The company team FIST serves as backup for A1A and is responsible for executing A1B.

As the enemy approaches the anchor point of the turning obstacle group, the dismounted FO executes group A1A, which also triggers the direct-fire engagement. The platoons in BPs T1 and B1 engage the enemy, orienting on TRPs 01 and 02. The dismounts in BP D1 engage the enemy orienting on TRP 01, getting the short-range weapons of the dismounted infantry into the fight. The dismounted FO can fire the mortar FPF to help destroy any dismounted attack on BP D1 or any dismounted breaching attempts at the anchor point. The combination of massed fires, obstacles, and terrain seals all bypasses in the north and forces the enemy to begin bypassing to the south.

The enemy begins bypassing as the result of small-unit actions. Small-unit leaders and individual vehicle commanders seek to avoid destruction and continue the attack, bypassing to the south. When the lead enemy vehicles pass TRP 04, the company team commander shifts fires from BPs T2 and B1 to the area between TRPs 02 and 03. First, the BFVs engage with TOWs only between TRPs 01 and 02. The change in orientation to cover the turn effect reduces the range of fire, and the BFVs begin using all weapon systems. Simultaneously, the tank platoon in BP T1 shifts its fires to the area between TRPs 02 and 03 but remains prepared to shift back to TRP 01. The dismounts in BP D1 continue to orient on TRP 01. The company team FIST adjusts group A1B to support the turn effect. All units maintain a high volume of fire to ensure that the enemy bypasses the turn obstacle group to the south and into the main TF EA.

FIRES AND FIX EFFECT

Commanders use the fix effect to focus fire planning and obstacle effort to slow an attacker within a specified area, normally an EA. The fix effect helps fires to defeat the enemy in detail or to gain the necessary time for forces to reposition while inflicting maximum casualties. To accomplish the fix effect, the obstacles and fires must—

- Cause the enemy to deploy into attack formation early.
- Allow the enemy to advance slowly into the EA.
- Make the enemy fight in multiple directions once he is in the EA.

Commanders plan indirect fires forward of the obstacles to suppress or neutralize the enemy. They synchronize indirect fires with long-range direct fires that cause the enemy to deploy out of a march or a prebattle formation. Ideally, units site obstacles at the enemy's maximum-fire range but inside the friendly effective fire range. If the enemy is in attack formation, this allows obstacles and fires to attack the full frontage of the enemy.

Initially, commanders orient fires on the enemy force as a whole. However, destroying enemy breaching assets becomes increasingly important as the enemy continues to advance into the EA. To maximize obstacle effect and inflict maximum losses on the enemy, the fire plan requires an increase in the intensity of fires as the enemy advances. Commanders plan successive TRPs, synchronized with obstacles closer to the BPs, which trigger engagement by additional weapons. They vary the intensity of fires through fire control to allow the enemy to continue a slowed advance. When the enemy fully commits, friendly forces complete its destruction.

Once the enemy commits in the EA, the fire plan forces the enemy to fight in as many directions as possible. This serves to further slow its advance, disrupt its C2, reduce its mass, and provide interlocking fires with flank shots on individual targets. Combining fires from multiple directions with the random orientation of individual obstacles further confuses the attacker. For direct fires, commanders consider the use of TRPs and supplementary positions to reorient fires. They also consider the use of protective obstacles to protect the force. The FSO and FISTs plan targets to hold the enemy in the EA and FPFs on critical MCs that may let the enemy threaten friendly positions.

Figure 3-4 illustrates some considerations for integrating fires and obstacles to achieve a fix effect. The TF commander has arrayed two company teams oriented into EA Black to destroy two enemy battalions. Team A, with two mechanized platoons and one tank platoon, occupies BP 21 oriented between TRPs 02 and 04. Team B has two tank platoons, one mechanized platoon, and one AT platoon and occupies BP 31 oriented between TRPs 01 and 02. The TF commander assigns Teams A and B subsequent positions in BPs 22 and 32, respectively. The TF commander directs his FSO to plan two artillery groups, A1A and A1B. Group

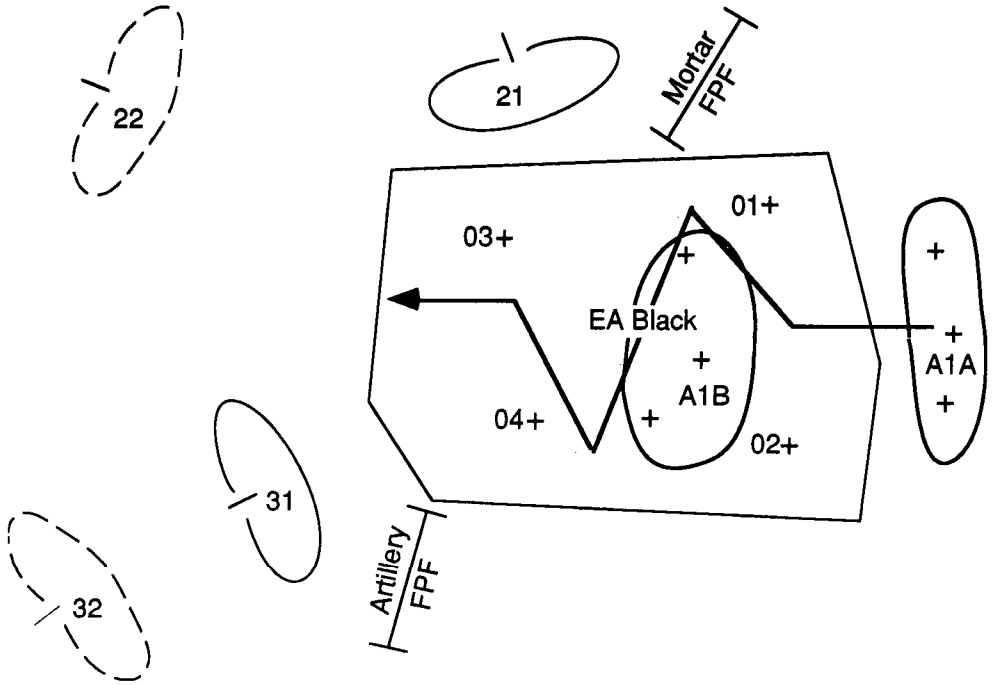


Figure 3-4. Fires and fix effect.

A1A is a neutralize mission to help force the enemy to deploy into prebattle or attack formations. Group A1B is a destroy mission to support the enemy's destruction in EA Black. The FSO assigns Team A's FIST the responsibility for A1A and A1B, with Team B's FIST providing backup. Team B is responsible for establishing EA Black and siting obstacles; however, they coordinate all TRP and obstacle locations with Team A.

The TF commander plans to vary the intensity of fires in the EA through effective fire control. As the enemy approaches the EA, Team A's FIST executes group A1A. According to the TF execution matrix, this triggers the long-range TOW fires from Team B's mechanized and AT platoons between TRPs 01 and 02. The enemy begins deploying into a prebattle formation and continues to advance.

As the enemy passes the line defined by TRPs 01 and 02, Team A's commander orders his mechanized platoons to begin engaging the enemy with TOWs oriented on TRP 02. The enemy begins deploying to an attack formation. As the lead enemy vehicles approach the line defined by TRPs 03 and 04, Team A's FIST executes group A1B. This triggers the fires of all weapons in both company teams. Team A orients between TRPs 02 and 04, and Team B orients between TRPs 03 and 04.

In the example, the enemy encounters increasing fires as it advances into the EA. The combined fires of both company teams and the indirect fires from A1B do not attack the enemy until it reaches TRPs 03 and 04. More importantly, the commander commits Team A's fires when obstacles affect the enemy's mobility the most. This kind of fire control requires a detailed execution matrix and detailed rehearsals by every leader.

The TF commander can reposition the company teams to BPs 22 and 32 to—

- Confuse the enemy.
- Maintain a standoff.
- Posture the force to disengage.

The TF commander allocates Team A one mortar FPF and Team B one artillery FPF. Each team commander places his FPF to protect the flanks of his position. He may also use these targets to contain assaulting forces. Team A and B commanders also designate supplementary positions within their BPs to which they can shift forces to address a threat to their flanks.

FIRES AND BLOCK EFFECT

Commanders use the block-obstacle effect to integrate fire planning and obstacle effort to stop an attacker along a specific AA or to prevent the enemy from advancing through an EA. To accomplish the block effect, the obstacles and fires must—

- Prevent the enemy from bypassing or breaching the obstacles.
- Maximize available standoff.
- Stop the enemy's forward movement.

Commanders consider obstacle protection when planning fire-control measures. The first mission of the overmatching force is to stop any bypassing or breaching attempt. They respond to any attempt to breach or bypass with a quick volley of direct and indirect fires. Blocking obstacles stop enemy maneuver and force the enemy to commit breaching assets that friendly forces destroy by fire. Higher level commanders may allocate other forces to the task of completing the enemy's destruction, such as a joint air attack team (JAAT) or a ground CATK.

To support survivability, commanders position forces to provide standoff so that the force can survive. The EA must cover the entire AA. The maximum effective range of the overmatching weapons, minus standoff, limits the depth of the EA. The commander positions his forces so that he can mass interlocking fires across the entire AA. The defending force must be able to concentrate

all available fires within the obstacle group. Commanders array weapon systems in depth based on their maximum effective ranges.

The success of the blocking effect is measured by its impact on the enemy advance, not by enemy losses. The block effect requires the most resource intensive type of tactical obstacle. Commanders only use it at critical points on the battlefield. Normally, the mission of forces overmatching a blocking obstacle effect is to defeat lead enemy units and cause the attacker to reconsider the deployment of follow-on forces. Normally, commanders cannot expect a force overmatching a blocking group to both protect the obstacles and defeat the enemy.

Figure 3-5 illustrates some considerations to integrate fires and the block effect. The TF commander has assigned Team A the mission to defend BP 5 oriented into EA Gold to stop an enemy battalion from advancing along this AA. Team A is an armor company team with two armor platoons and an AT platoon. Team A's commander positions one armor platoon each in BPs 15 and 25 and the AT platoon in BP 35. The company team commander positions the BPs to allow each weapon to engage about 1,000 meters beyond the obstacles and still achieve acceptable standoff. Fire-control measures include TRPs 01 and 04 at the north and south ends of the obstacle group, TRP 02 forward of the obstacle group, and TRP 03 at the rear of the obstacle group. The TF commander orders the FSO to plan artillery group AID as a destroy mission on the obstacle group. He also plans two linear targets along the rear trace of the obstacle group. Team A's FIST is responsible for executing all indirect targets.

As the enemy vehicles enter EA Gold, they are still in a march formation. As the lead enemy units pass the line defined by TRPs 01 and 04, and the line defined by TRPs 04 and 02, they hit the first obstacles in the block-obstacle group. The company team commander initiates volley fires from all

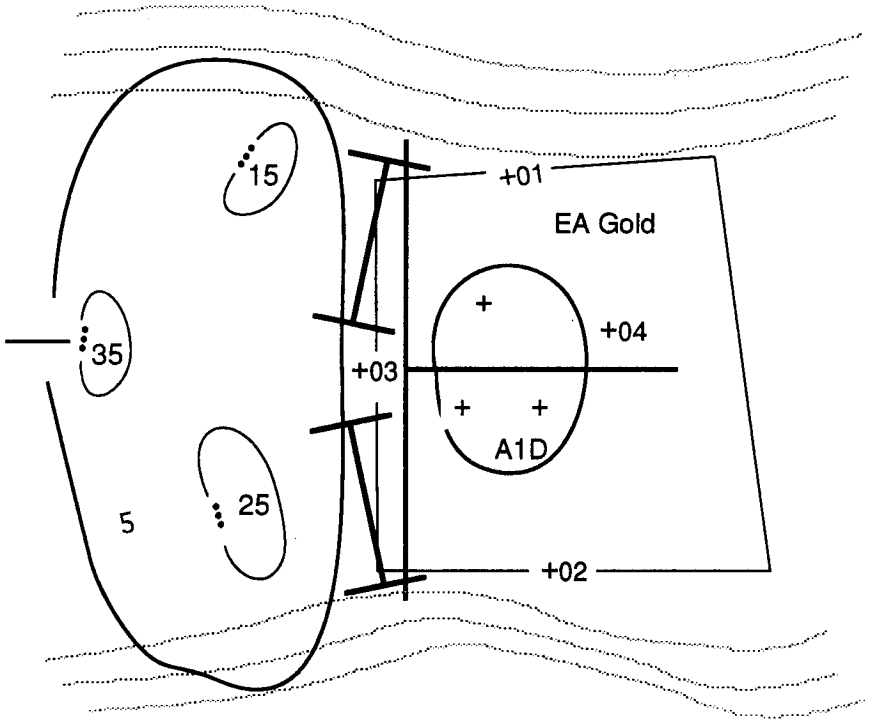


Figure 3-5. Fires and block effect.

platoons. The tank platoons in BPs 15 and 25 orient between TRPs 04 and 02 and between TRPs 01 and 04, respectively. The AT platoon orients between TRPs 01 and 02. The tank platoons concentrate on TRPs 01 and 02 to defeat any bypass attempts where the obstacles tie into the impassable terrain. All forces concentrate on destroying any breaching assets as they move forward.

As the enemy continues to advance, some breaching attempts are successful through the initial obstacles. The company team commander emplaced obstacles in depth and shifts fires from BP 15 to between TRPs 01 and 03 and from BP 25 to between TRPs 03 and 02. The company team FIST executes group AID to help in the destruction of breaching assets. The company team commander shifts the fires from BP 35 to concentrate on breaching equipment.

Because of the depth and complexity of the obstacles, the high volume of fires destroyed most of the enemy's breaching assets. The company team continues a high volume of fire to defeat further breaching attempts and to discourage the enemy from committing follow-on forces along this AA.

OBSTACLES AND OPERATIONS IN DEPTH

Commanders use obstacles to support operations in depth. Mission analysis drives the need for and the types of obstacles; however, analyzing requirements throughout the depth of the battlefield provides some idea of how to use obstacles. Commanders consider three complementary elements when planning obstacles to support operations. They are—

- Deep operations.
- Close operations.
- Rear operations.

DEEP OPERATIONS

Normally, commanders use situational obstacles to support deep operations. In the offense, they use obstacles to help interdict enemy reinforcements or reserves. In the defense and in the retrograde, they use obstacles to attack enemy follow-on formations or subsequent echelons. Commanders use these obstacles to support counterfire activities against enemy indirect-fire units. They also use obstacles to attack enemy assets at fixed airfields or logistics sites.

CLOSE OPERATIONS

During close operations, commanders use the full range of tactical and protective obstacles. Offensive, defensive, or retrograde operations usually require different types of obstacles.

In the offense, commanders use situational obstacles to support the defeat of defending enemy forces. They attack enemy reserves or reinforcing units with these obstacles. Commanders use them to prevent forces from repositioning or to fix part of a defending enemy force while massing on the remainder of the force. They also use obstacles to protect the flanks of friendly units, and they plan obstacles on the objective to support their transition to the defense. Reconnaissance and security forces use situational obstacles to help delay or defeat enemy CATKs. During movements to contact (MTCs), security forces use situational obstacles to help fix enemy forces while the friendly main body maneuvers into a position of advantage. Commanders ensure that obstacles do not interfere with the maneuver of the reserve.

In the defense, commanders integrate all types of obstacles to slow, canalize, and defeat the enemy's major units. In an area defense, the commander uses protective obstacles to enhance survivability. He relies

on directed and reserve obstacles focused on retaining key and decisive terrain. He may use situational obstacles to deal with unexpected threats or to support economy-of-force efforts. For a mobile defense, the commander uses directed obstacles to create the conditions for destroying the enemy. He uses situational obstacles to support CATKs and reserve obstacles to maintain control over MCs. The commander tailors obstacles to ensure the mobility of the force.

Although obstacle use in the retrograde is very similar to that in the defense, reserve obstacles are extremely important in the retrograde. Commanders focus on critical points along high-speed AAs. The enemy is usually attempting to advance over the same routes that a unit is using for the retrograde. Commanders retain positive control over these routes with reserve obstacles.

In the defense or retrograde, security forces use different reinforcing obstacles depending on the security force mission. Requirements for reinforcing obstacles increase from the screen to guard and cover missions. A screening force uses directed and situational obstacles to help harass and impede the enemy or to assist in its displacement. A guard force uses all types of tactical obstacles to assist in the delay. It may use hasty protective obstacles for protection against the enemy's assault. A covering force not only attacks, defends, and delays but also deceives the enemy regarding the location, size, and strength of forces in the main battle area (MBA). The covering force employs obstacles to a greater extent than the guard force. The number of obstacles must resemble the number in the MBA to support the deception of the location of the MBA.

REAR OPERATIONS

Protective obstacles are the primary reinforcing obstacle employed in support of rear operations. In the offense, most protective obstacles are hasty. In the defense, deliberate protective obstacles are common around strongpoints and fixed sites. Units in BPs normally use hasty protective obstacles. In the retrograde, units use deliberate protective obstacles around fixed sites, but hasty protective obstacles are most common. Units design protective obstacles specifically for the anticipated threat. Protective-obstacle effort is proportionate to the threat level. As the threat level increases, the protective-obstacle effort must increase. The force may employ tactical obstacles to counter any major threat to the rear operations.

OBSTACLE CONTROL

Obstacle control varies with echelon and METT-T. The basic idea is to limit subordinates only as necessary to synchronize their obstacle efforts with the commander's intent and scheme of maneuver. A lack of obstacle control can cause obstacles to interfere with the higher commander's scheme of maneuver. Too much obstacle control can cause a lack of obstacles that support the refined fire plans of subordinate commanders.

To provide obstacle control, commanders focus or withhold obstacle-emplacement authority or restrict obstacles. They use obstacle-control measures, orders, or other specific guidance. Commanders and staffs consider width, depth, and time when they conduct obstacle-control planning. The following concepts guide this planning:

- Support current operations.
- Maximize subordinate flexibility.
- Facilitate future operations.

SUPPORT CURRENT OPERATIONS

Commanders and staffs use obstacle control to focus obstacle effort where it will clearly support the scheme of maneuver and commander's intent. They also plan obstacle

control to ensure that obstacles will not interfere with current operations.

MAXIMIZE SUBORDINATE FLEXIBILITY

Commanders normally give subordinates flexibility to employ obstacles similar to the flexibility to conduct tactical missions. For example, defending in sector requires flexibility in obstacle employment. A commander will give subordinates maximum emplacement authority to support the defender's freedom to maneuver and decentralized fire planning. A commander will probably focus obstacle-emplacement authority for a unit defending from a BP. Defending from a BP requires more obstacle control because the BP dictates the defender's position and orientation of fires. In the offense, commanders normally retain a higher degree of control due to limited opportunities for obstacle emplacement and more requirements for friendly mobility. Commanders frequently withhold emplacement authority or restrict the use of most obstacles.

FACILITATE FUTURE OPERATIONS

The need for future mobility drives the need for obstacle control to facilitate future operations. A CATK axis and objective are examples of future mobility needs. Another example is a route for units that need to reposition forward as part of a higher commander's plan. Commanders usually withhold emplacement authority or use restrictions to ensure that obstacles do not interfere with future maneuver; however, they may focus obstacle efforts to develop a situation that will support future operations.

Commanders can focus obstacle-emplacement authority using obstacle-control measures. For example, a division commander wants a brigade to defend well forward. The commander gives the brigade an obstacle zone that includes only the forward part of its sector. The division commander thus ensures that any obstacles the brigade emplaces will support a defense forward in the sector.

Other specific guidance or orders provide a means to focus obstacle-emplacement authority. For example, a corps commander may include in his OPORD instructions for a division to concentrate obstacle effort along a specific enemy AA. A second example is a brigade commander that wants a TF to force the enemy into an adjacent TF sector. The brigade commander gives the TF an obstacle belt that encompasses most of the TF sector, but he assigns an intent (target, obstacle effect, and relative location) to the belt. The target helps to focus the type of obstacles the subordinate will choose. The effect (here it is to turn the enemy into the adjacent TF sector) helps focus the obstacle array. The relative location, within the belt, still allows the TF commander maximum flexibility to develop his own scheme of maneuver and obstacle plan.

Commanders withhold obstacle-emplacement authority using control measures, orders, or other specific guidance. For example, a commander withholds authority by shaping obstacle-control measures so that they do not overlap the CATK axis and objective, ensuring the freedom of the CATK force.

Obstacle restrictions are an important tool for providing obstacle control. For example, a corps commander may designate a CATK axis, through a division AO, as an obstacle restricted area. A division commander may restrict obstacles in objectives and planned BPs within the division sector to SCATMINEs with a not later than (NLT) SD time.

The commander considers the following dimensions when planning obstacle control:

- Width.
- Depth.
- Time.

Maneuver control measures can aid in tailoring the width and depth of obstacle-control measures. Typical graphics that aid in focusing the width and depth of obstacle-control measures are—

- Unit boundaries and phase lines (PLs).
- Battle handover lines (BHLs) and forward edges of the battle area (FEBAs).
- Lines of departure (LDs) and lines of contact (LCs).
- Fire-support coordination lines (FSCLs), no-fire areas (NFAs), and coordinated fire lines (CFLS).
- Passage lanes and corridors.
- CATK axis and movement routes.
- Objectives, future BPs, and AAs.

Commanders also consider time when planning obstacle control. For example, the use of an on-order obstacle zone gives the commander the ability to give a subordinate obstacle-emplacement authority only after a certain time or event. Also, the use of mines with a SD time within a control measure allows a commander to limit the time that obstacles affect an area.

ECHELONS OF OBSTACLE PLANNING

The nature of obstacle integration from corps to company team leads to an echelonment of obstacle planning. At each lower level, commanders and staffs conduct more detailed planning. At corps level, planning mainly consists of planning obstacle restrictions, although the corps may plan reserve, situational, or directed obstacle groups. At the company-team level, planning consists of the detailed design and siting plans to emplace and integrate the directed obstacles in the TF obstacle groups.

The echelonment of obstacle planning requires that commanders at each level provide subordinates with the right combination of positive control and flexibility. At each level, obstacle planning builds on the obstacle plan from higher echelons. Without obstacle zones and belts, units must submit a report of intention (see *Appendix B)* for every obstacle. The report doubles as a request when units initiate it at levels below emplacement authority. Units do not submit the report if the higher HQ grants emplacement authority. Commanders give the authorization to install obstacles when they establish obstacle-control measures. As an exception, units do not submit reports of intention for conventional obstacles that are part of an operation plan (OPLAN) or general defense plan (GDP) if the authorizing commander approves the plan.

CORPS-LEVEL PLANNING

Corps-level obstacle planning primarily centers on obstacle control. The corps develops obstacle restrictions to ensure that division obstacles do not interfere with the corps' scheme of maneuver and future operations. The corps also provides obstacle-emplacement authority to ACRs and separate brigades using obstacle zones; however, they do not provide obstacle-emplacement authority to divisions. Divisions already have the authority to emplace conventional obstacles within their AOs. The corps plans reserve or situational obstacle groups only as they are necessary to support the corps' scheme of maneuver. In very rare instances, the corps may plan directed obstacle groups.

Figure 3-6, page 3-14, shows a corps defending with two divisions on line, an ACR as a covering force, and a separate brigade in reserve. The corps plans a zone in the ACR covering force area to provide the ACR

commander with obstacle-emplacement authority and to focus the ACR obstacle effort close to the forward line of own troops (FLOT). Because the corps commander wants to allow the ACR commander flexibility, he does not assign a specific obstacle effect to the zone. To ensure that the corps CATK is not hindered by obstacles, the commander designates in the OPORD that the corps CATK axis is an obstacle restricted area, with no obstacles allowed.

DIVISION-LEVEL PLANNING

At the division level, obstacle planning is more directive than at corps level. Divisions concentrate on planning obstacle zones to give brigades and other major subunits (such as a cavalry squadron) obstacle-emplacement authority. Divisions also use restrictions with the obstacle zones to ensure that brigade obstacles do not interfere with corps- or division-level operations. Divisions plan reserve and situational obstacle groups to support the division's and corps' scheme of maneuver. Again, the planning of directed obstacle groups is rare.

In Figure 3-7, the 52d Infantry Division (ID) (mechanized) of the defending corps conducts its defense with two brigades on line and a brigade in reserve. The division plans a zone well forward in 3d Brigade's sector and targeted at an enemy division AA. This constrains the brigade's obstacle-emplacement authority and ensures that its obstacles do not interfere with the corps' or division's CATK routes. Note that the division does not need to designate either CATK axis as an obstacle restricted area. No one who is subordinate to the division has authority to emplace obstacles in these

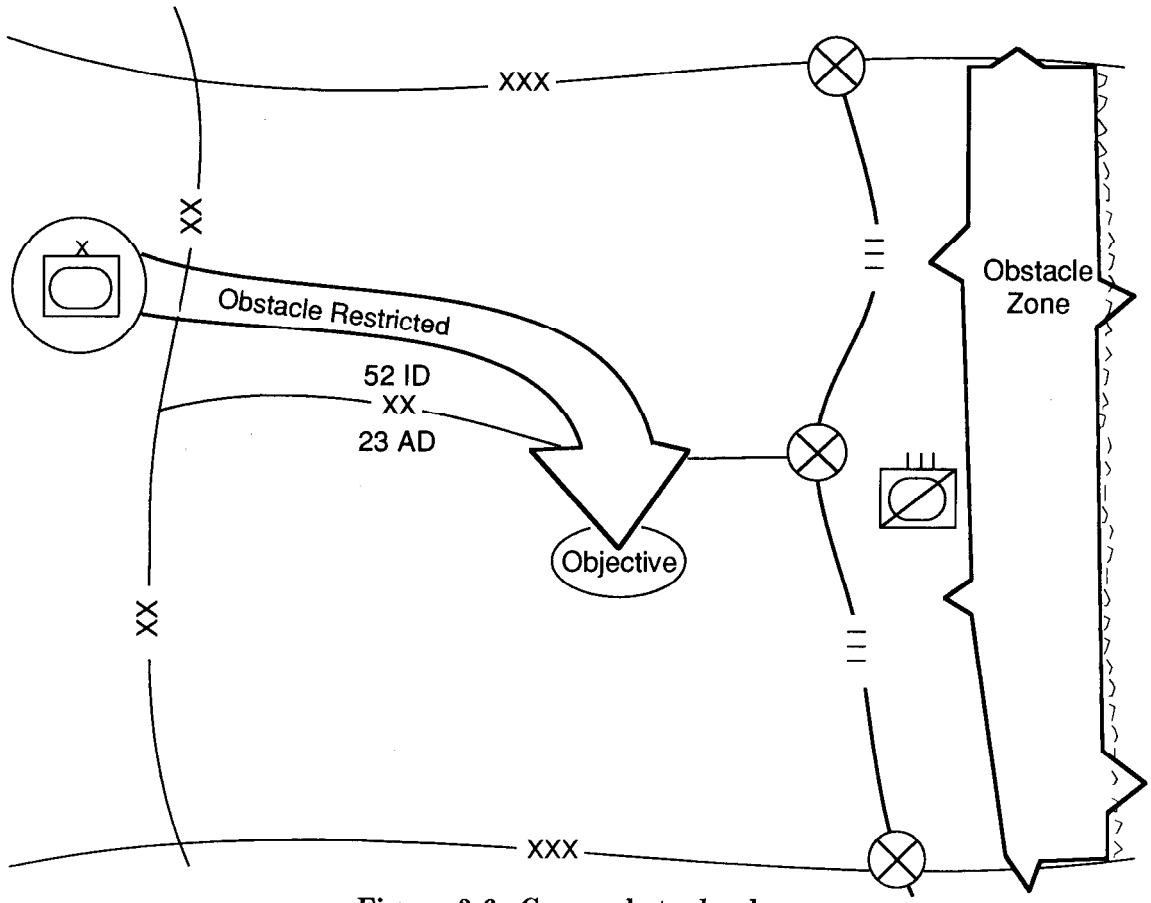


Figure 3-6. Corps obstacle plan.

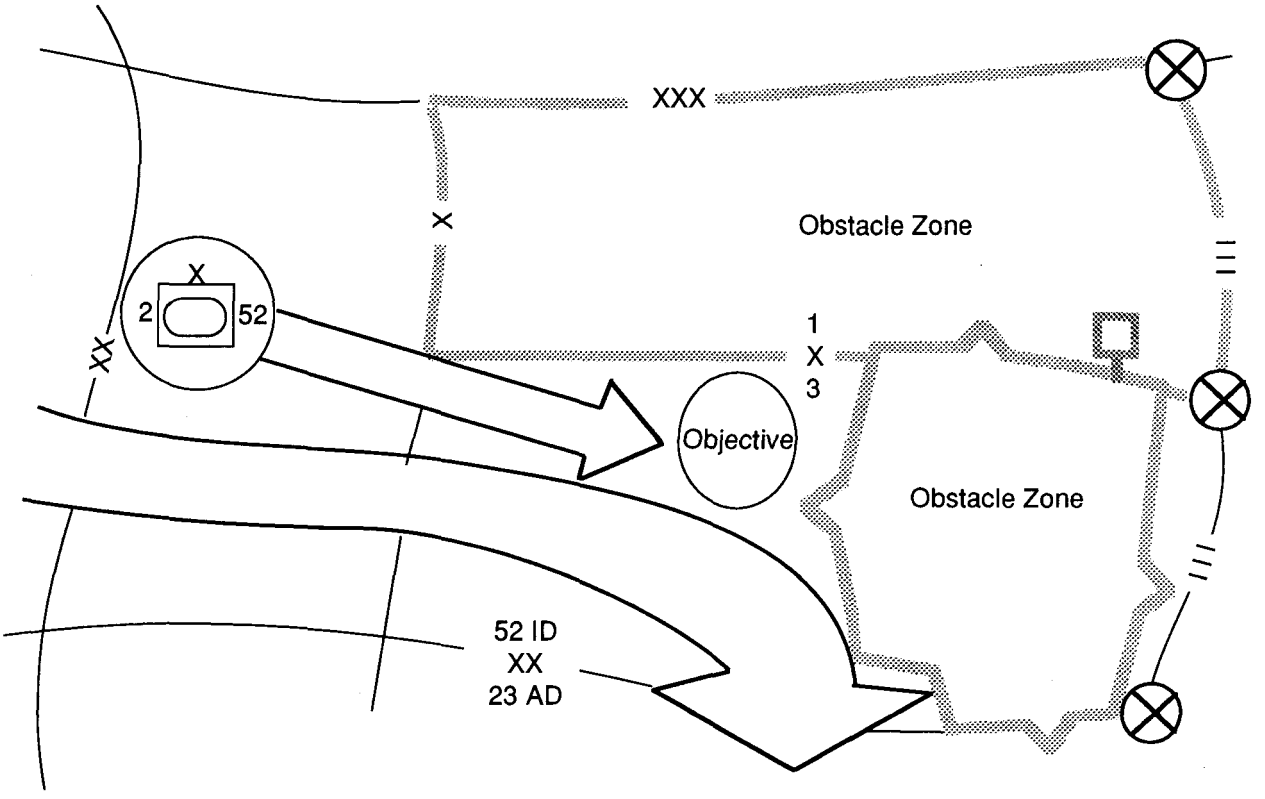


Figure 3-7. Division obstacle plan.

areas. In the north, the division designates the entire 1st Brigade sector as a zone, targeted at an enemy division; therefore, no additional graphic is required. However, the division has designated a contact point on the brigades' boundaries and has directed them to coordinate obstacles on the ground.

BRIGADE-LEVEL PLANNING

Brigade-level units conduct more detailed obstacle planning. Brigades plan obstacle belts that give obstacle-emplacement authority to TFs. Brigades also use obstacle restrictions. Frequently, they plan situational obstacle groups and reserve obstacle groups. Directed obstacle group planning is more common than at division level; however, it is still rare.

Based on his analysis of METT-T, the 1st Brigade commander of the 52d ID decides to defend as shown in *Figure 3-8, page 3-16.* He has positioned TF 4-27 in a BP and has assigned it responsibility for a block obstacle belt to defeat a second echelon enemy regiment. TF 2-27 has responsibility for a fix obstacle belt in the north to destroy an enemy first echelon regiment. In the south, the commander assigns TF 1-93 a turn obstacle belt, positioned well forward in the sector to prevent an enemy regiment from advancing along the boundary with the 3d Brigade. Note that the commander has specified an effect for each belt. Also, the commander has designated a contact point between the two TFs to facilitate obstacle coordination.

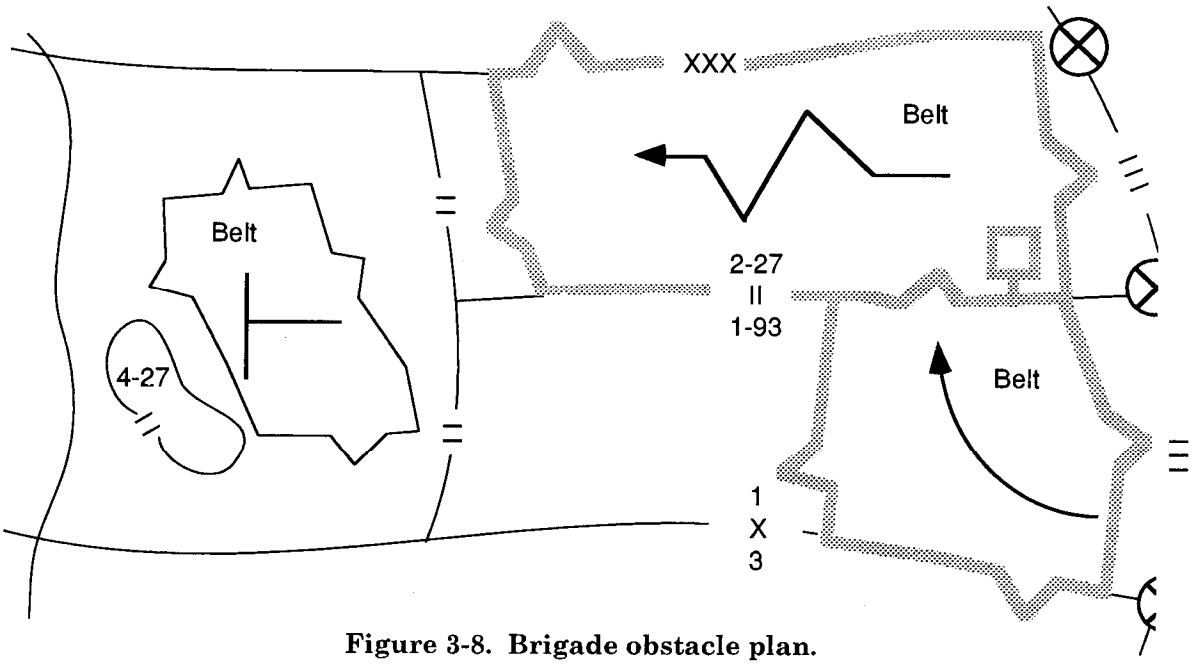


Figure 3-8. Brigade obstacle plan.

TASK-FORCE-LEVEL PLANNING

TFs conduct the majority of detailed obstacle planning. They plan most obstacle groups that are executed at the company team level. Most of these obstacle groups are directed obstacles, but TFs can also plan reserve and situational obstacles. TFs may use restrictions, but normally do not because of the level of detail of the TF obstacle plan.

TF 1-93 plans to defend as shown in *Figure 3-9* and plans two obstacle groups to support his defense. He assigns responsibility for the turn obstacle group to Team A in BP A, but Team A must coordinate the siting of the obstacle with Team D in BP D. Team B in BP B is responsible for the block obstacle group. Note that the TF commander plans his obstacle groups to support his direct-fire plan and the brigade commander's intent to turn the enemy north.

COMPANY-TEAM-LEVEL PLANNING

At the company team level, obstacle planning focuses on the detailed design and siting plans to execute the directed, situational, and reserve obstacle groups planned at higher levels.

Figure 3-10 shows the obstacles Team A designed and sited to support the obstacle group intent. Note that the obstacles are in depth and tied into terrain. The company team designed and sited the obstacles on the ground. The company team commander integrated the obstacles with direct and indirect fires to achieve the block effect.

Obstacle planning is an inherent part of the tactical decision-making process. *Chapters 4 and 5* provide the TTP necessary for commanders and staffs to conduct obstacle planning and provide information on how to integrate obstacles.

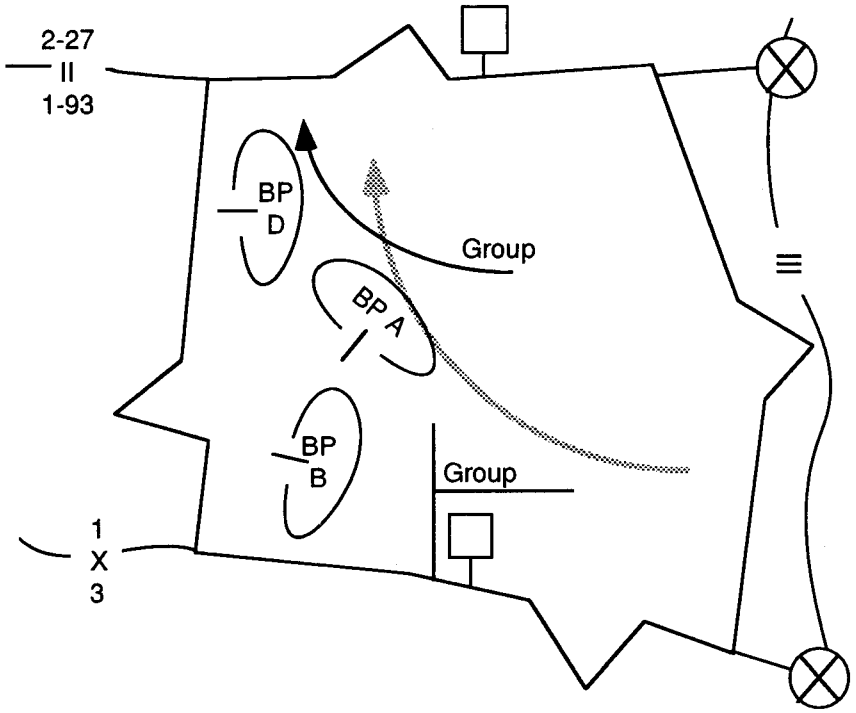


Figure 3-9. TF obstacle plan.

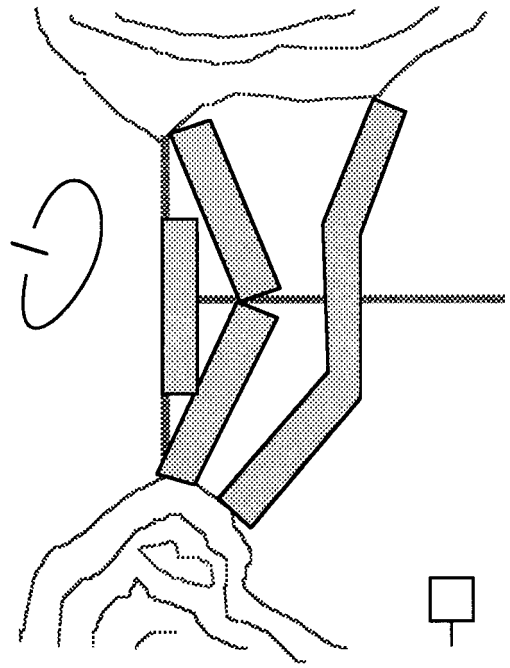


Figure 3-10. Company team obstacle plan.

Chapter 4

Obstacle Planning at Corps, Division, and Brigade Levels

Commanders and staffs consider the use of obstacles when planning offensive, defensive, and retrograde operations. This chapter describes obstacle planning as it applies at corps, division, and brigade levels. At these levels, concentration is on granting obstacle-emplacement authority or providing obstacle control. At corps and division level, commanders focus on developing obstacle zones and restrictions. At the brigade level, commanders focus on developing obstacle belts and restrictions. At all three levels, commanders may plan obstacle groups, but this is rare.

At each level, commanders include obstacle planning in the decision-making process. This ensures that obstacle integration is effective and that the obstacle plan is flexible enough to allow changes during the planning, preparation, and execution phases of an operation. The following is a method for integrating obstacle planning at corps, division, and brigade levels, using the decision-making doctrine in *FM 101-5.*

DECISION-MAKING PROCESS AND OBSTACLES

The decision-making process is as detailed or as simple as time permits. The commander plays a key role in the process, with the staff providing advice and information related to their areas. *Figure 4-1, page 4-2,* shows the decision-making process with major considerations for obstacles at each step. These steps are—

- Mission analysis.
- Course-of-action development (COA).
- COA analysis and comparison.
- Decision and execution.

Before beginning the decision-making process, the commander receives his mission or deduces the mission based on an analysis of the current operation. The staff quickly identifies the type of operation, current intelligence situation, and time available (estimate).

MISSION ANALYSIS

The first step of the decision-making process involves the following activities:

- Determine the facts and develop assumptions.
- Analyze the mission of the higher HQ and the commander's intent.
- Analyze the relative combat power.
- Issue the commander's guidance.

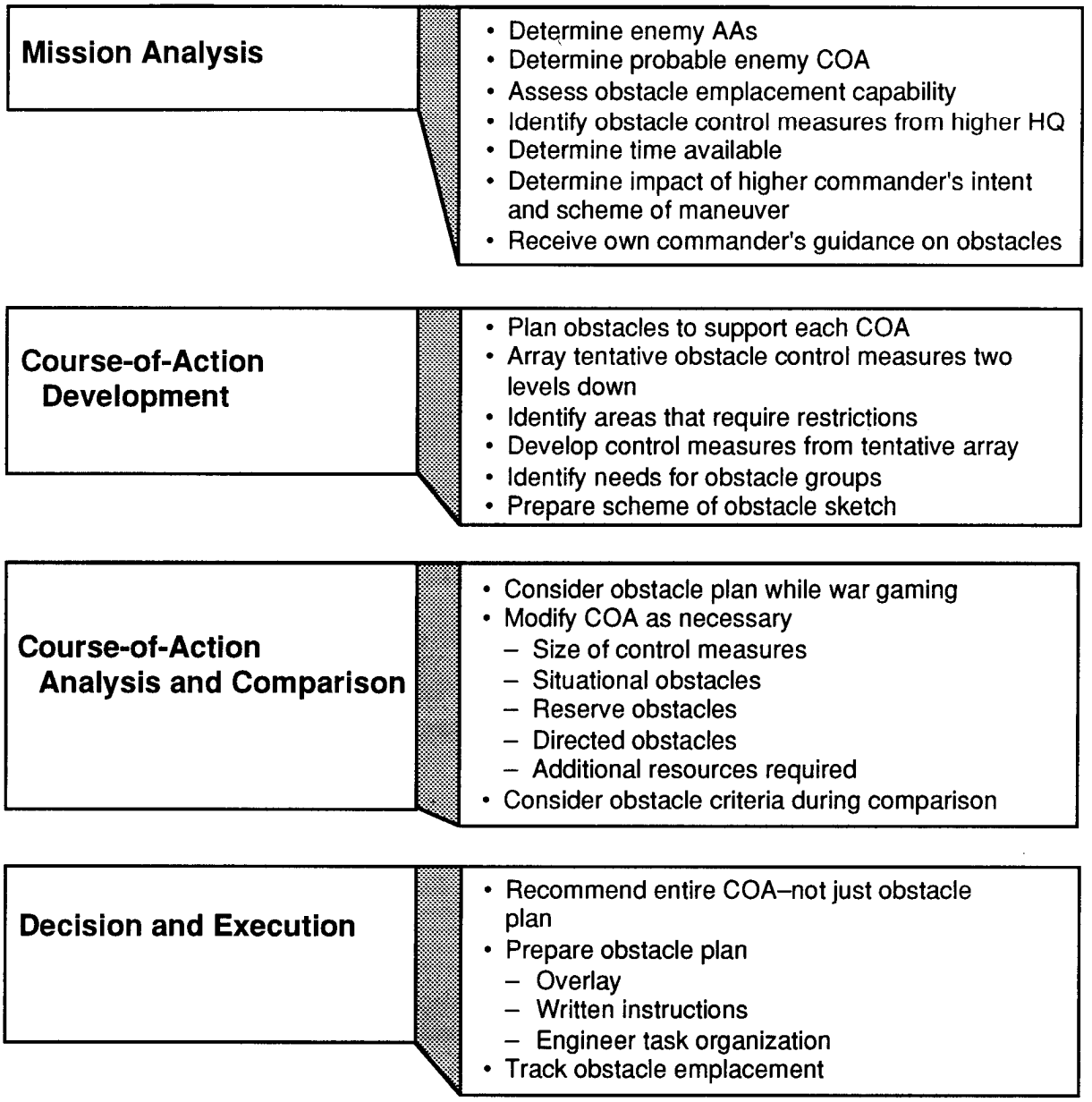


Figure 4-1. Decision-making process and obstacle planning.

Determine Facts and Develop Assumptions

The commander relies on the staff to provide the facts and assumptions on which he can base his mission analysis, restated mission, commander's guidance, and COA development. The staff prepares or updates estimates to determine the facts and assumptions used in the decision-making process. *Table 4-1* lists some METT-T considerations for the staff when developing its estimates. The staff uses these estimates as the framework for developing facts and assumptions on obstacles.

Obstacle planning requires information from the following estimates:

- Intelligence.
- Logistics.
- Fire support.
- Engineer.

The staff may not prepare written estimates but uses the general format and the thought process involved at every level. At each lower level, the amount of detail required increases. For example, at corps level, logisticians address Class IV and Class V obstacle material in terms of short

Table 4-1. MET-T considerations for obstacles.

METT-T Factors	Considerations
Mission	• What is the mission? • What is the concept of the operation and the scheme of maneuver? • What obstacle-control measures are required? • What is the obstacle intent?
Enemy	• What are the enemy-breaching assets? • What is the likely enemy COA? • What is the most dangerous COA? • How does the enemy employ his forces and breaching assets?
Terrain	• Consider OCOKA: – What effect does the terrain already have on the enemy? – What is observation like? – Are cover and concealment available? – Where are the existing obstacles? – Where is the key terrain? – Where are the AAs? – How will the weather affect mobility? – How will the terrain affect mobility?
Troops Available	• What is the status of engineer and maneuver training, experience, soldiers, and equipment? • What obstacle-emplacement assets are available? • What transportation assets are available?
Time Available	• How long before the operation begins? • How much planning time is available?

tons. At brigade level, the staff must deal with numbers of obstacle packages or mines.

Intelligence Estimate. The entire staff has input into the intelligence estimate; however, the Assistant Chief of Staff G2 (Intelligence)/Intelligence Officer (US Army) (S2) has general responsibility. A detailed description of this estimate can be found in *FMs 101-5, 34-1, and 34-10.* The IPB includes the intelligence information required to integrate obstacles, such as—

- AAs (friendly and enemy)
- Allocation of enemy combat power.
- Array of enemy forces two levels lower (location and formation).
- Enemy objectives, main effort, and options.
- NAIs/TAIs/decision points (DPs).
- Enemy vulnerabilities and enemy DPs.
- Enemy breaching capabilities.

Logistics Estimate. The logistics estimate helps the staff determine the unit's obstacle capability. The resources available and the transportation assets available to move the resources are both important. Normally, transportation assets are not dedicated assets but are available only during a specified time window. Therefore, the staff must consider where and when the unit will need the resources. The following information concerning Class IV and Class V obstacle materials is important for obstacle planning:

- Type and quantity of material available.
- Location of the material.
- Location where the material is required.
- Distance from current location to required location.
- Transportation assets available to move the material.
- Schedule for moving the material.

This information will help the staff determine the feasibility of a COA based on logistics. The engineer uses this information in the engineer estimate.

Fire-Support Estimate. The primary purpose of the fire-support estimate is to provide information to integrate fires with the scheme of maneuver; however, the fire-support estimate also helps to integrate obstacles properly. The following information is useful for obstacle planning:

- Total fire-support capability (such as batteries, battalions, attack helicopters, or fixed-wing sorties).
- FASCAM capable assets (artillery or air-delivered).

Engineer Estimate. The staff engineer conducts an engineer estimate to provide the necessary engineer-related information for use in the decision-making process. Although there are several steps to the engineer estimate, the engineer uses the engineer battlefield assessment (EBA) for facts and assumptions. The EBA provides the following information for obstacle planning:

- Terrain analysis.
- Enemy engineer mission and mobility/survivability (M/S) capabilities.
- Friendly M/S capabilities.

The commander and staff use these estimates to complete the decision-making process.

Analyze Higher Headquarters' Mission and Commander's Intent

An analysis of the higher headquarters' mission and the commander's intent identifies information that may impact on the mission and which the staff uses in later steps of the decision-making process. The staff finds this information in the higher unit's OPORD or OPLAN and in annexes that are included. Components of this analysis are—

- Intent.
- AOs and deception.
- Tasks.

- Limitations.
- Assets available.
- Risk.
- Time analysis.

Intent. The staff analyzes the higher commander's intent to determine the purpose for obstacles and the desired end state for obstacles to support future operations. Even if the higher commander does not explicitly state an intent for obstacles, the staff must identify information from his intent that will impact on obstacle planning. For example, the commander's intent states that the purpose of the current defense is to set the stage for a major offensive operation. The staff must consider the measures necessary to prevent obstacles from hindering that future offensive operation.

AOs and Deception. The AO dictates the physical limits of any obstacle use. The staff must be aware of the requirements for the deception plan of the higher HQ as it develops an obstacle plan.

Tasks. The staff determines the specified and implied tasks from its higher HQ that impact on obstacle planning.

Specified tasks include—

- Obstacle groups (directed, situational, or reserve) from higher HQ.
- Obstacle zones with specified effects (brigade).
- Obstacle restrictions.

Implied tasks include—

- Obstacle restrictions for attack/CATK axis, BPs, objectives, and AAs.
- Obstacle-handover coordination during a relief-in-place mission.
- Requirement to grant obstacle-emplacement authority and provide obstacle control to subordinates.

Limitations. The staff determines the limitations (things that cannot be done or that must be done) that will affect obstacle employment. Limitations include the following:

- Must emplace obstacle groups from higher HQ.
- Must emplace obstacles to support zones with specified effects (brigade).
- Cannot emplace obstacles outside obstacle zones (brigade).
- Cannot emplace obstacles in areas that violate obstacle restrictions.
- Cannot use obstacles that violate obstacle restrictions.

Assets Available. To determine the assets that are available, the staff uses the various staff estimates and analyzes the task organization of the higher HQ. Some assets that may affect obstacle planning include—

- Intelligence assets that can support obstacle execution.
- Assets (ground and air) for moving or handling obstacle materials.
- Engineer units for tactical obstacle emplacement.
- Other units with manpower or equipment to support obstacle emplacement.
- Air or artillery assets with SCATMINE capability.

Risks. The staff identifies any risks that the higher HQ is willing to accept to accomplish a mission. One example is putting the priority obstacle effort in a defense on the most likely enemy AA while planning situational obstacles on the most dangerous AA. Another example is identifying where the higher HQ is using economy-of-force measures along a secondary AA. The staff may plan for additional obstacles along that AA to help compensate for the smaller maneuver force allocated for the defense.

Time Analysis. The staff determines the time available and the decision cycle and receives the time allocation from the commander. The staff should consider the 1/3 to 2/3 rule; however, the staff must understand that obstacles are usually time intensive. It

pushes known information to lower levels early so that units do not waste valuable time. The staff also uses the time analysis to help determine total obstacle capability. For example, an engineer unit of a certain size can complete an approximate number of obstacles in a specified time.

The commander considers all of the information discussed previously when determining the essential tasks and a restated mission. However, obstacles by themselves are normally not essential tasks or a part of the restated mission.

Analyze Relative Combat Power

The staff analyzes relative combat power. It normally establishes a comparative base for friendly and enemy units, computes the relative combat power, and evaluates the results. Obstacles, like many other factors (such as air power, terrain, or leadership), have an effect when integrated with fires, but the commander and staff subjectively assign a value for obstacles. They may have to wait until they develop a COA before they can assign a value for obstacles and then recompute the ratio of combat power.

Issue Commander's Guidance

The commander issues his concept and states how he visualizes the conduct of the battle. *FM 101-5* covers this area in detail. The commander must articulate how he will integrate obstacles to shape the battle and enhance the fire plan. He issues guidance on obstacle control, obstacle priority, and desired effects. The level of specificity that a commander provides in his guidance is based on the experience of the staff, the time available, established habitual relationships, and standing operating procedures (SOPs). The commander should provide the following guidance:

- Location where friendly forces will mass fires to kill the enemy.
- Obstacle intent.
- Authority to emplace different types of obstacles and obstacle restrictions.
- Use of air or artillery assets (employment of area denial artillery munition (ADAM) /remote antiarmor mine (RAAM) versus artillery on firing targets of opportunity).
- Use of digging assets (survivability versus countermobility).
- Use of maneuver forces in the obstacle effort.
- Risk acceptance of M/S tasks.
- Obstacle turnover and lane closure information.
- Proposed CATK and other movement routes.

COURSE-OF-ACTION DEVELOPMENT

In the next step of the planning process, the commander and staff develop the maneuver COA in broad terms. After they develop the maneuver COA, they develop a supporting obstacle plan, which is also in broad terms. The staff determines the details concerning obstacles during the analysis of the COA (war gaming) phase. The COA development consists of the following steps:

- Array initial forces.
- Develop a scheme of maneuver.
- Determine C2 means.
- Prepare COA statement and sketches.

Once the staff prepares the COA statement and sketch, it considers how to support the COA with obstacles. The staff considers using obstacles throughout the depth of the battlefield. *Table 4-2 and Table 4-3, page 4-8,* show some considerations for obstacles in the offense and defense respectively.

The staff tentatively sketches obstacle-control measures that support the units two levels lower. When the staff arrays forces, it considers the terrain and enemy. When the staff determines the location and size of the obstacle-control measures,

Table 4-2. Offensive obstacle planning.

Phase	Obstacle Considerations
Deep Operations	• Impede enemy reinforcement by follow-on echelons • Establish the hasty defense • Fix enemy CATK forces • Disrupt enemy C2 or CSS assets • Support counterfire operations or attacks on enemy aviation facilities
Close Operations	• Provide flank protection during movement • Prevent enemy repositioning • Counter enemy penetrations • Fix local CATK forces • Support the unit if the attack fails • Support the unit during local enemy CATKs
Rear Operations	• Protect fixed CSS sites • Counter enemy deep operations

it considers the terrain, the enemy, the friendly force array, and the scheme of maneuver. For example, when the corps is in the defense, it arrays brigades along enemy division AAs. The corps staff sketches in tentative obstacle zones, considering the terrain, targeting the enemy division, and supporting the arrayed brigades and the corps' scheme of maneuver. At the division level, the staff uses obstacle belts, while at the brigade level, it uses groups. At each level, the staff identifies those areas where mobility needs may require obstacle restrictions. These tentative control measures may also provide a starting point for resourcing obstacles (discussed in detail in *Appendix C)* and for developing the obstacle plan to support the COA.

The staff uses the tentative obstacle-control measures to develop obstacle-control measures that support the COA. The corps staff draws separate obstacle zones for ACRs or separate brigades. It draws obstacle restricted areas or identifies areas requiring obstacle restriction within the division areas. The division staff uses the tentative obstacle belts to assist in drawing obstacle zones. The brigade staff draws obstacle belts based on the tentative groups. Both the division and brigades may draw obstacle restricted areas or identify other restrictions to support the scheme of maneuver. Zones and belts must fall within the subordinate unit's boundaries. The staff considers the obstacle-integration principle of obstacle-control when drawing the obstacle-control measures.

Other considerations may affect the obstacle plan. The staff also considers the use of obstacles to support the reserve force. With Assistant Chief of Staff, G3 (Operations and Plans) (G3)/S3 approval, the staff prepares a scheme-of-obstacles sketch that addresses how obstacles support the maneuver COA.

COURSE-OF-ACTION ANALYSIS

Staff analysis identifies the best COA for recommendation to the commander. To analyze the COAs, the staff uses war gaming techniques. They war-game the obstacle plan with the supported COA, not separately. Considerations for the staff during war gaming are as follows:

Table 4-3. Defensive obstacle planning.

Phase	Obstacle Considerations
Deep Operations	• Delay or disrupt lead elements • Separate the follow-on elements • Shape the battle space
Close Operations	• Enhance fires to support screen, guard, or cover mission • Disrupt enemy lead elements forward of the MBA • Protect the security force • Assist security-force disengagement • Close lanes/gaps after security force withdrawal • Disrupt enemy lead elements in the MBA • Turn the enemy into the EA • Fix the enemy in the EA • Block the enemy from leaving the EA or along an AA • Protect the MBA force • Protect the flanks • Disrupt the movement and commitment of the follow-on forces • Fix the enemy reserve • Reinforce emplaced obstacles with additional obstacle effort • Support the reserve-force fires in the objective area • Protect the reserve's flank • Support the reserve's hasty defense on the objective • Hinder the withdrawal of the enemy force • Hinder the enemy's ability to reinforce the area
Rear Operations	• Provide force protection • Emplace tactical obstacles to counter enemy deep operations

- Resources required for obstacle plan (see *Appendix C).*
- Priorities, if requirements exceed capabilities.
- Obstacle plan that supports the COA and commander's intent.
- Adequate restrictions to ensure freedom of maneuver for friendly forces during current and future operations.
- Plan that addresses all specified and implied tasks.
- G2/S2 integration of enemy breaching capability and reactions to obstacles.

If necessary, the staff modifies the COA following war gaming. It also identifies branch plans, information requirements, subordinate unit tasks, and additional requirements for combat support. Added considerations at this point are—

- Changes to the size or location of control measures, based on changes to the scheme of maneuver, boundaries, axis of advance, objectives, EAs, or the addition of branches.
- Requirements for reserve obstacles (see *Chapter 6* for specific considerations).
- Requirements for situational obstacles (see *Chapter 7* for specific considerations).
- Requirements for directed obstacles.

- Taskings to subunits to emplace obstacles.
- Additional engineer units required for tactical obstacle emplacement.

After each COA is war-gamed, the staff compares the results to analyze the advantages and disadvantages of a COA relative to the other plans. It compares each COA to the others, using specific evaluation criteria that it develops or that the commander directs. Relevant criteria that commanders and staff may find useful in comparing COAs include the following:

- Which COA requires the least obstacle resource expenditure?
- Which COA has the least impact on local infrastructure by obstacles (such as destroyed bridges)?
- Which COA causes the fewest hindrances to future mobility due to obstacles?

DECISION AND EXECUTION

The final step of the decision-making process is deciding on and executing a COA.

Recommendation and Decision

The objective of the comparison is to make a unified recommendation to the commander on the best COA. The staff may give greater consideration to a COA that requires a more difficult obstacle plan if it looks like the best selection based on other battlefield operating system (BOS) perspectives. The staff informs the commander where he must accept risk regarding obstacles or request additional assets to avoid that risk. The staff must also be prepared to inform the commander where those assets may be obtained and what influence he may have to exert to get them. Knowledge of the higher and adjacent unit assets is important.

The commander chooses the COA to adopt for final planning. He may select a specific COA, modify a COA, or combine parts of several COAs. In any event, the commander decides and issues additional guidance to the staff for developing the plan. The staff then completes the plan and prepares the order.

Plans and Orders

The engineer normally prepares the obstacle plan, and the commander approves the plan or the order. The staff coordinates with and receives permission from the higher HQ for obstacles required outside an obstacle-control measure. It coordinates obstacles planned on flanks with adjacent units. The staff coordinates guidance on obstacles in the rear area with the operations officer and controlling units. The staff also distributes the obstacle plan to higher and subordinate units.

Obstacle plans at the corps, division, and brigade levels normally contain the following:

- Obstacle restrictions (either graphically or clearly stated).
- Reserve obstacle groups (especially for passage lanes) and execution criteria and plans (see *Chapter 6* for details).
- Situational obstacle groups (if any) and an execution matrix (see *Chapter 7* for details).
- Engineer unit task organization.

At the corps level, the following is added to the plan:

- Obstacle zones for separate brigades and ACRs (and intent, if specified).

See *Figure 4-2, page 4-10,* for an example of a corps obstacle overlay.

At the division level, the plan also includes the following:

- Obstacle zones for brigades (and intent, if specified).
- Guidance on the use and reporting of protective obstacles.

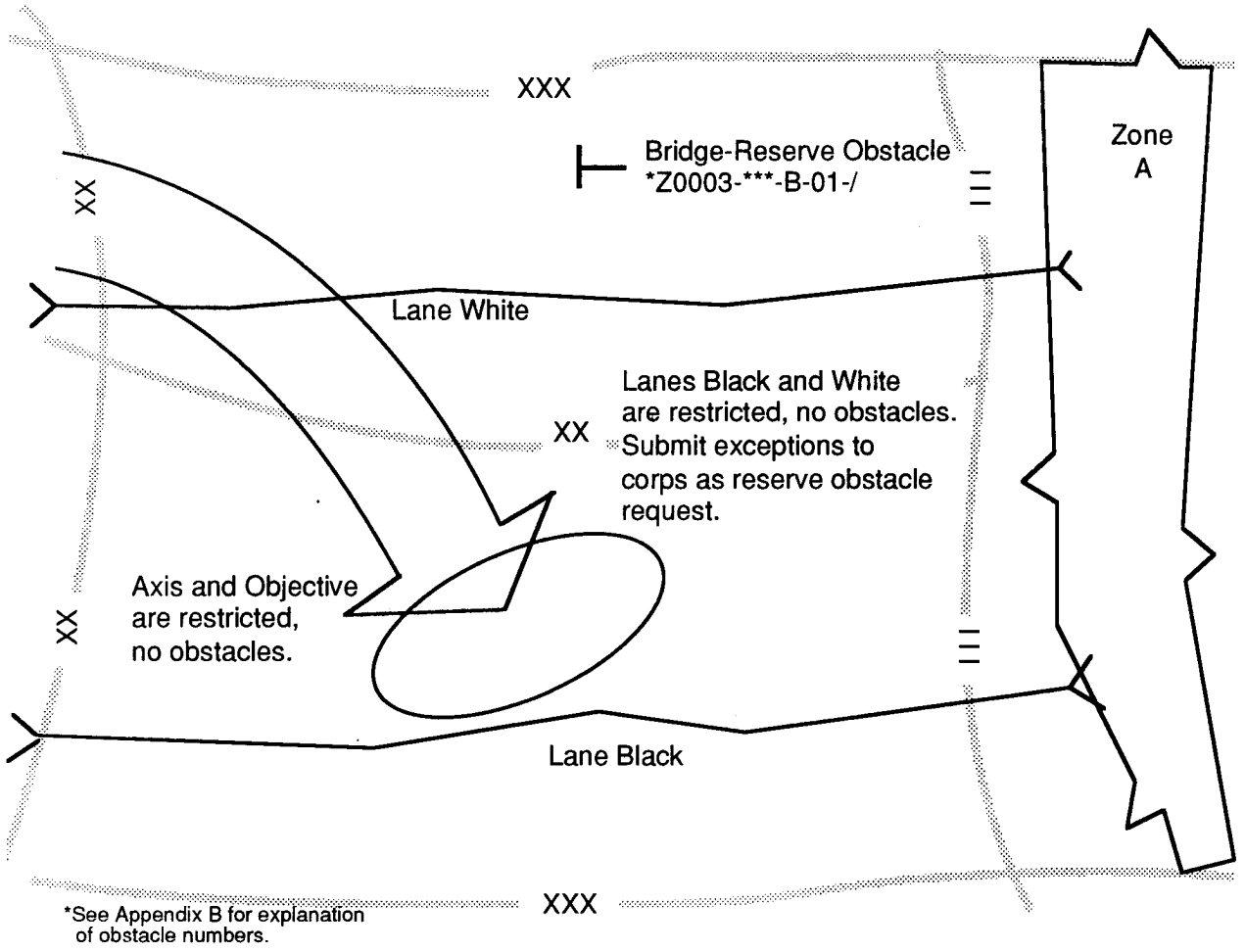


Figure 4-2. Corps obstacle overlay.

- Engineer unit task organization.

See *Figure 4-3* for an example of a division obstacle overlay.

At the brigade level, the plan also includes the following:

- Obstacle belts for the TF (and intent, if included).
- Guidance on the use and reporting of protective obstacles..
- Guidance on obstacle ownership and emplacement.

See *Figure 4-4, page 4-12,* for an example of a brigade obstacle overlay.

Execution and Supervision

Units refine obstacle plans. They—

- Continue to analyze incoming intelligence to ensure the validity of the obstacle plan in comparison to the expected threat.
- Ensure that subunits report obstacle-control measures and obstacles as they develop and execute their plans (see *Appendix B).*
- Shift assets, request additional assets, or modify the plan based on the obstacle effort completed and new or developing requirements.
- Continue planning.

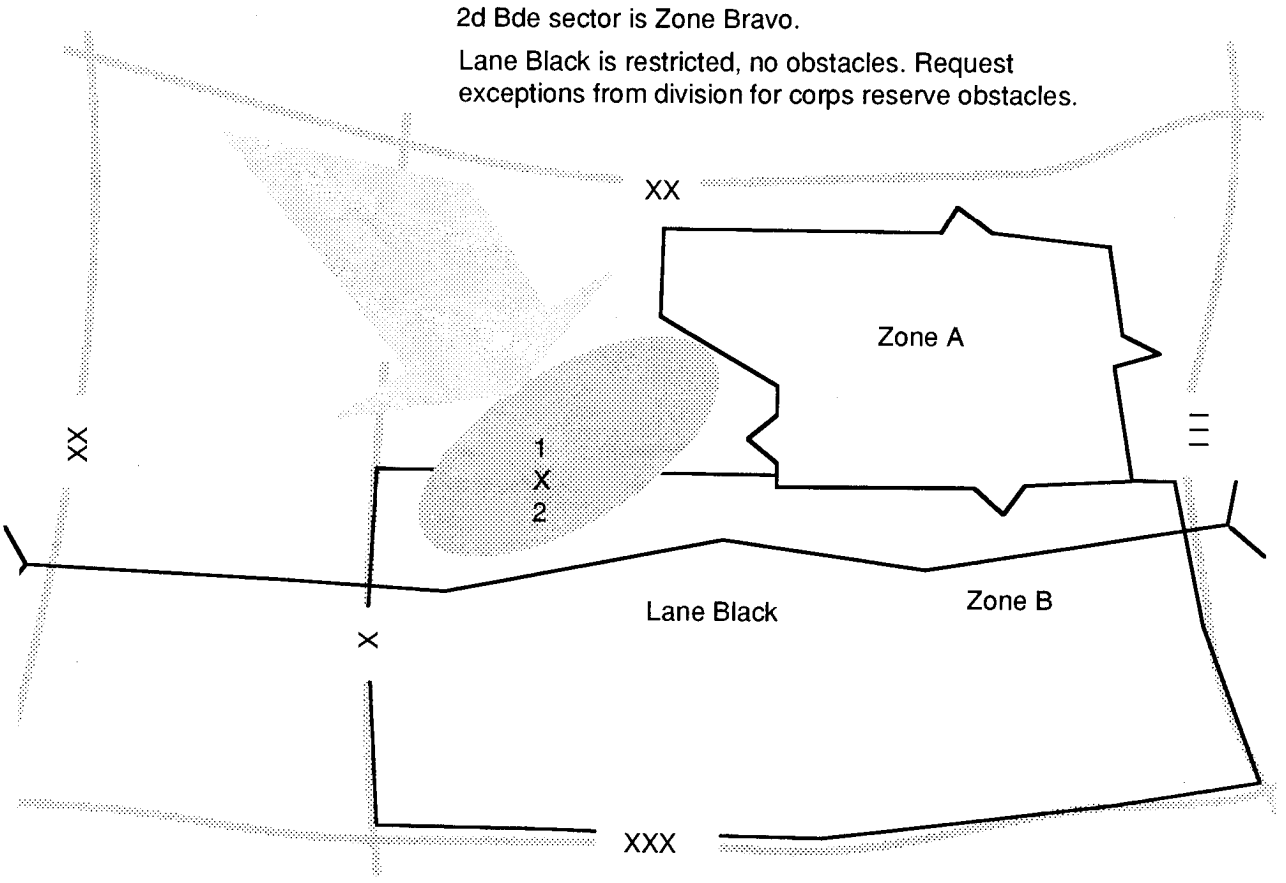


Figure 4-3. Division obstacle overlay.

The following paragraphs contain a defensive scenario for obstacle planning at the division level. The process is the same at the corps or brigade level.

DIVISION DEFENSIVE SCENARIO

This scenario illustrates the integration of obstacles into the division decision-making process in the defense. Note that this illustration highlights only certain aspects of the decision-making process and focuses on a single COA.

MISSION ANALYSIS

As part of facts and assumptions, the staff determines the following concerning enemy forces and the AAs in sector (see *Figure 4-5, page 4-13):* The enemy has five regimental-size AAs in the division sector. In the north, two regimental AAs turn into a division-size AA and then revert to three regimental AAs. In the south, there are three regimental AAs that change into a division-size AA.

The staff has completed all other estimates and gathered the information necessary for planning. It has analyzed relative combat power and determined that the ratios support a defense. In addition, it has analyzed the higher HQ commander's mission and intent. In this case, there are no specific impacts on division obstacle planning in the corps' plan. The staff incorporated the commander's guidance into the plan.

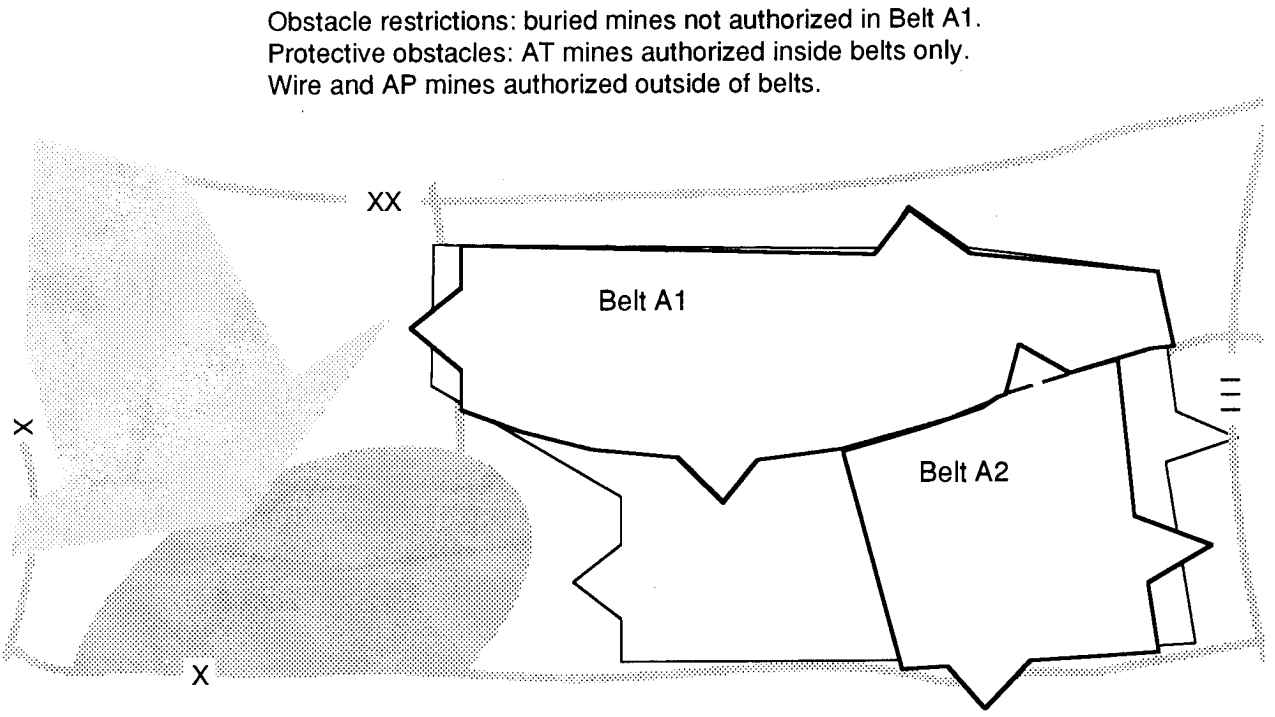


Figure 4-4. Brigade obstacle overlay.

COURSE-OF-ACTION DEVELOPMENT

The staff developed the following COA (see *Figure 4-6, page 4-14):* The division defends in sector to defeat two first-echelon motorized rifle divisions (MRDs) and a second echelon MRD. The division uses the division cavalry squadron to screen between PL River and PL Ocean and then conducts battle handover to two brigades defending on line. The northern brigade will defeat an enemy division forward of PL Stream. The brigade will then delay back to PL Lake, allowing enemy penetration into an apparent salient. The southern brigade will defend forward of PL Stream and allow penetration no greater than platoon size. The reserve brigade will CATK along Axis Copperhead into Objective Viper to destroy a second echelon MRD. The aviation brigade will CATK along Axis Rattler into Objective Cobra, targeting the second echelon MRD's C2 and CSS assets.

The staff sketches tentative obstacle belts (see *Figure 4-7, page 4-15).* It also draws in areas that require obstacle restrictions. The following paragraphs describe the decisions the staff made during this process.

The staff anticipates that the cavalry squadron could employ three disrupting obstacle belts to shape the battle. It groups these tentative belts into Obstacle Zone Alpha. Based on the covering-force mission, the obstacle zone must allow maximum flexibility to employ tactical obstacles. PL River (BHL) directly impacts on the obstacle zone's design. The staff adjusts the rear of the obstacle zone forward of PL River to allow MBA forces to employ tactical obstacles to support the battle handover.

The northern brigade defends in sector between PL River and PL Lake. The staff considers the mobility requirements for the reserve brigade's mission forward of PL

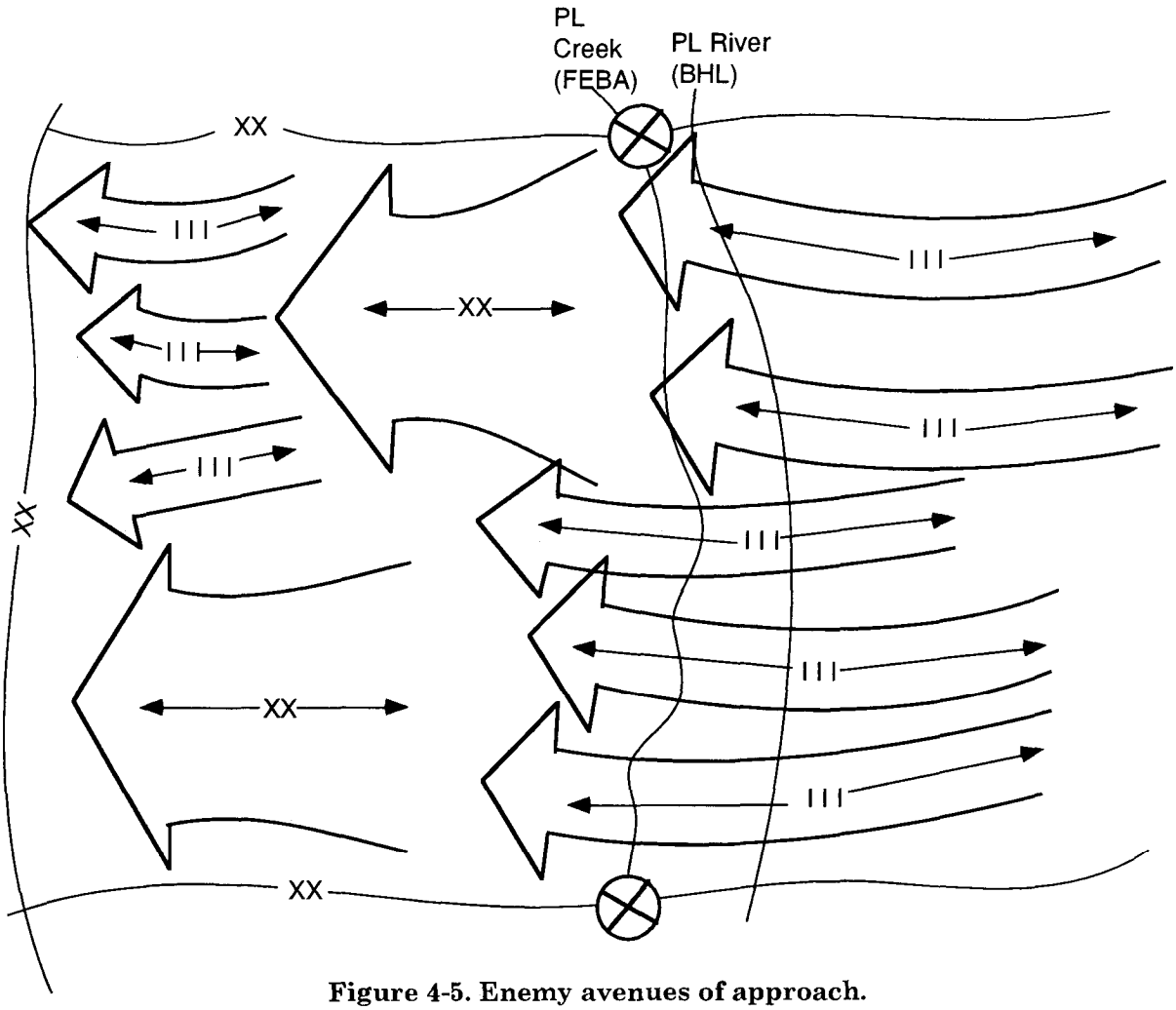


Figure 4-5. Enemy avenues of approach.

Stream along Axis Copperhead and Objective Viper. The staff anticipates that the brigade could employ two fixing obstacle belts forward of PL Stream, one on each AA. The staff also anticipates that the brigade will require two blocking belts on the northern two AAs. Based on these considerations, and to keep the division's CATK axis and objective restricted from obstacle emplacement, the staff plans two obstacle zones for the northern brigade.

Obstacle Zone Bravo encompasses the BHL (PL River). This zone has two regimental AAs. To give the brigade commander maximum flexibility, the width of this obstacle zone covers the entire sector. The depth of the zone provides for battle handover of the northern two regimental AAs. To facilitate the division's CATK, the commander restricts the depth of the obstacle zone to Objective Viper. These requirements dictate the shape of Obstacle Zone Bravo.

Obstacle Zone Charlie is deep in the brigade sector. This zone has three regimental AAs. To give the brigade commander maximum flexibility, the zone width will cover from the northern boundary to Axis Copperhead. This covers two of the three AAs. The CATK force will use the third AA. The forward edge of the zone is in the vicinity of Objective Viper. The depth of the zone requires no

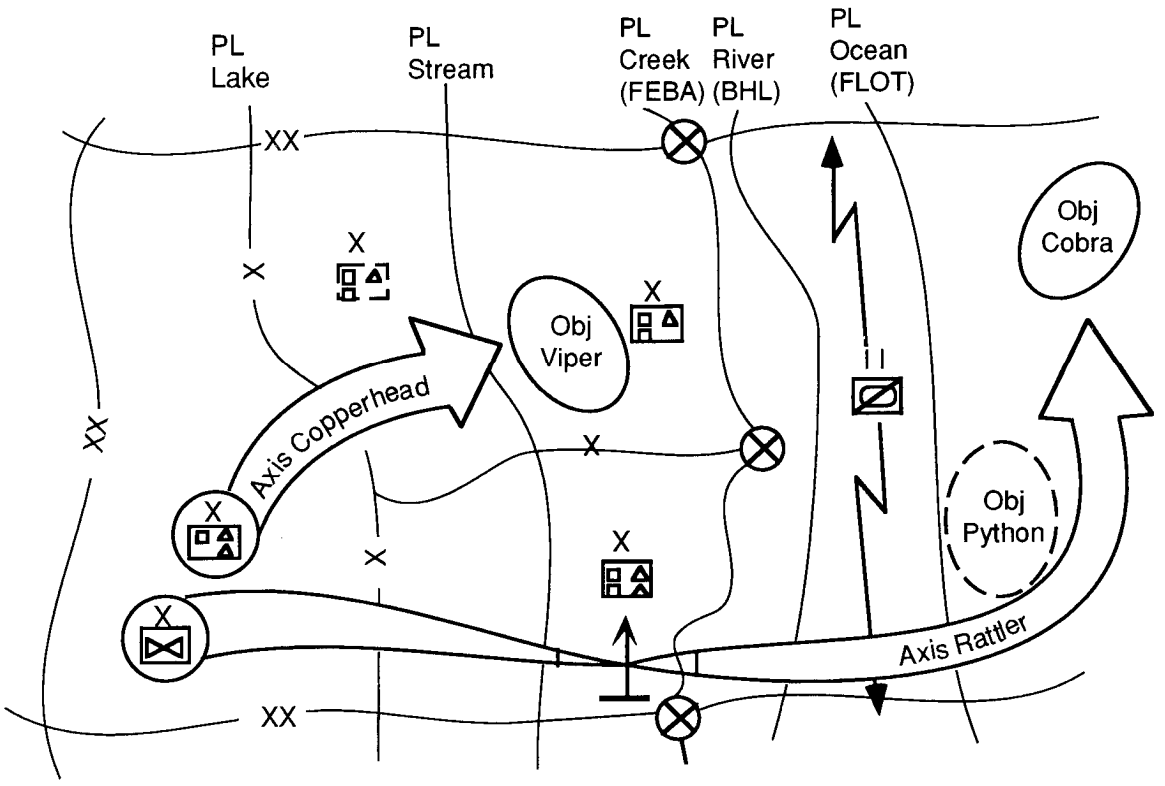


Figure 4-6. Maneuver course of action.

restriction; therefore, the brigade's rear boundary dictates the zone's depth.

For the southern brigade, the staff uses the same approach to develop the shape of Obstacle Zone Delta. To support the commander's intent and show a strong defense forward, the staff puts the zone's rear boundary forward of PL Stream. This will cause a concentration of countermobility effort along the BHL to PL Stream.

The staff must plan for the rearward passage of the cavalry. It recommends to the G3 that Lane Blue and Lane Red be restricted from any obstacle emplacement. The brigades must coordinate directly with the division for reserve obstacle groups to close these lanes, if required.

Based on the obstacle plan to support the COA, the staff determines the resources required to support the plan.

Note: The examples used to illustrate obstacle resourcing above TF level in *Appendix C* relate directly to this scenario.

COURSE-OF-ACTION ANALYSIS

The staff analysis of the COA results in some modifications to the obstacle plan. They plan a "be-prepared" Obstacle Zone Golf to support the division reserve's CATK into Objective Viper. Obstacle resources allocated to this zone will be for situational obstacles to fix the enemy formations.

The aviation brigade is conducting a supporting attack against the second echelon division's rear in Objective Cobra. Tactical obstacles would aid the attack helicopters in their fight. The staff tailors Obstacle Zones Echo and Foxtrot to support the fight in Objective Cobra and Python respectively.

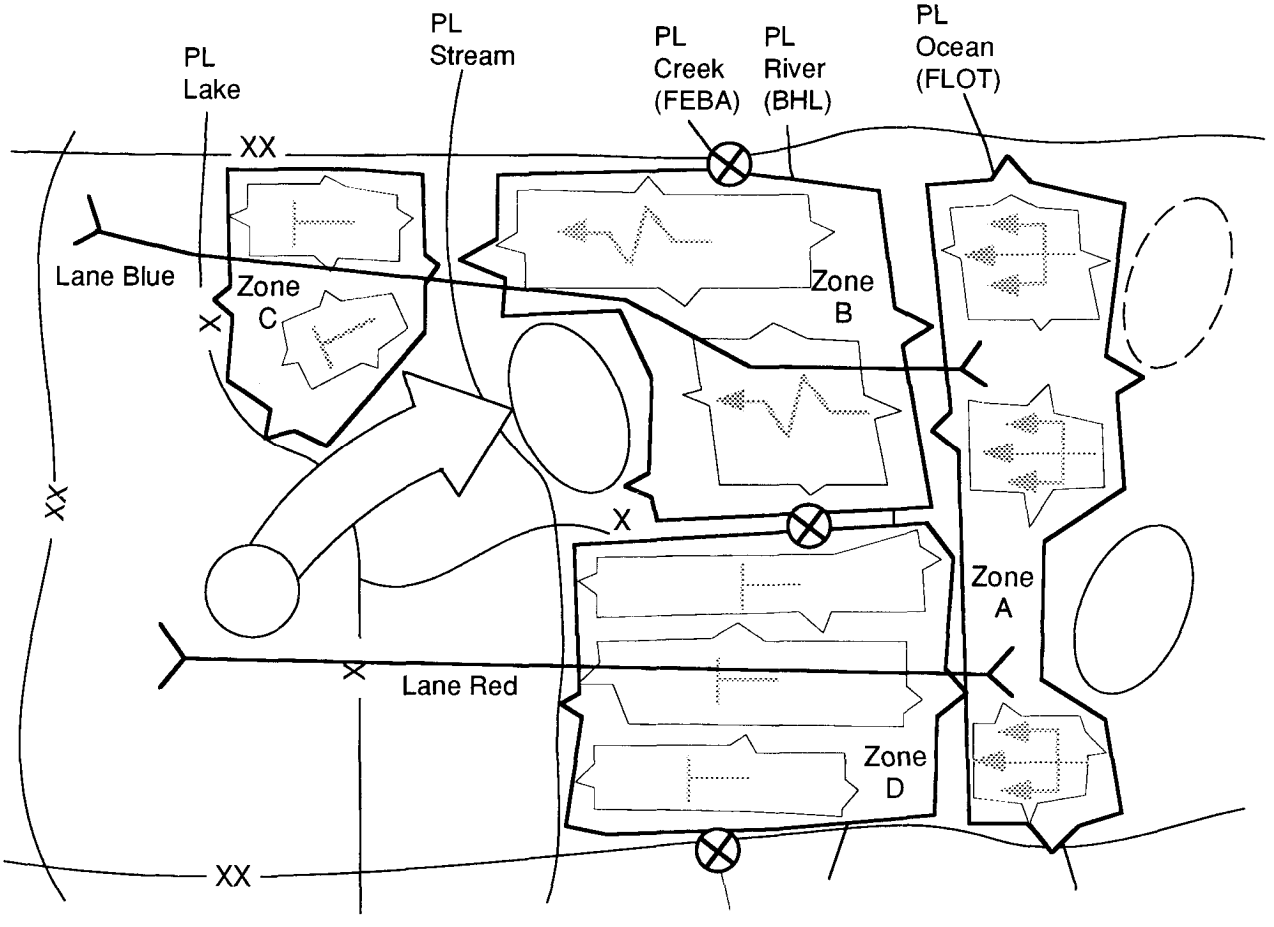


Figure 4-7. Developing obstacle-control measures.

ADAM and RAAM are available. ADAM and RAAM allocations will require coordination with the fire-support coordinator (FSCOORD).

DECISION AND EXECUTION

Based on their analysis, the staff recommended the COA in this scenario to the commander, and he approved. The staff prepares the actual orders, to include the obstacle plan and overlay *Figure 4-8, page 4-16,* shows this division's obstacle overlay. The staff also fills in the details required for a complete plan. One detail that the staff addresses is guidance on protective obstacles.

The staff does not plan protective obstacles, but it does provide guidance on emplacement authority and allocates resources for protective obstacles in the division rear. In this case, the division authorizes the brigades to delegate protective-obstacle-emplacement authority for all types of obstacles to company team level within obstacle zones. Outside obstacle zones, units only use wire obstacles for protective obstacles.

In the division rear, the division delegates protective-obstacle-emplacement authority to the base cluster commanders. CSS assets must survive to provide sustainment to

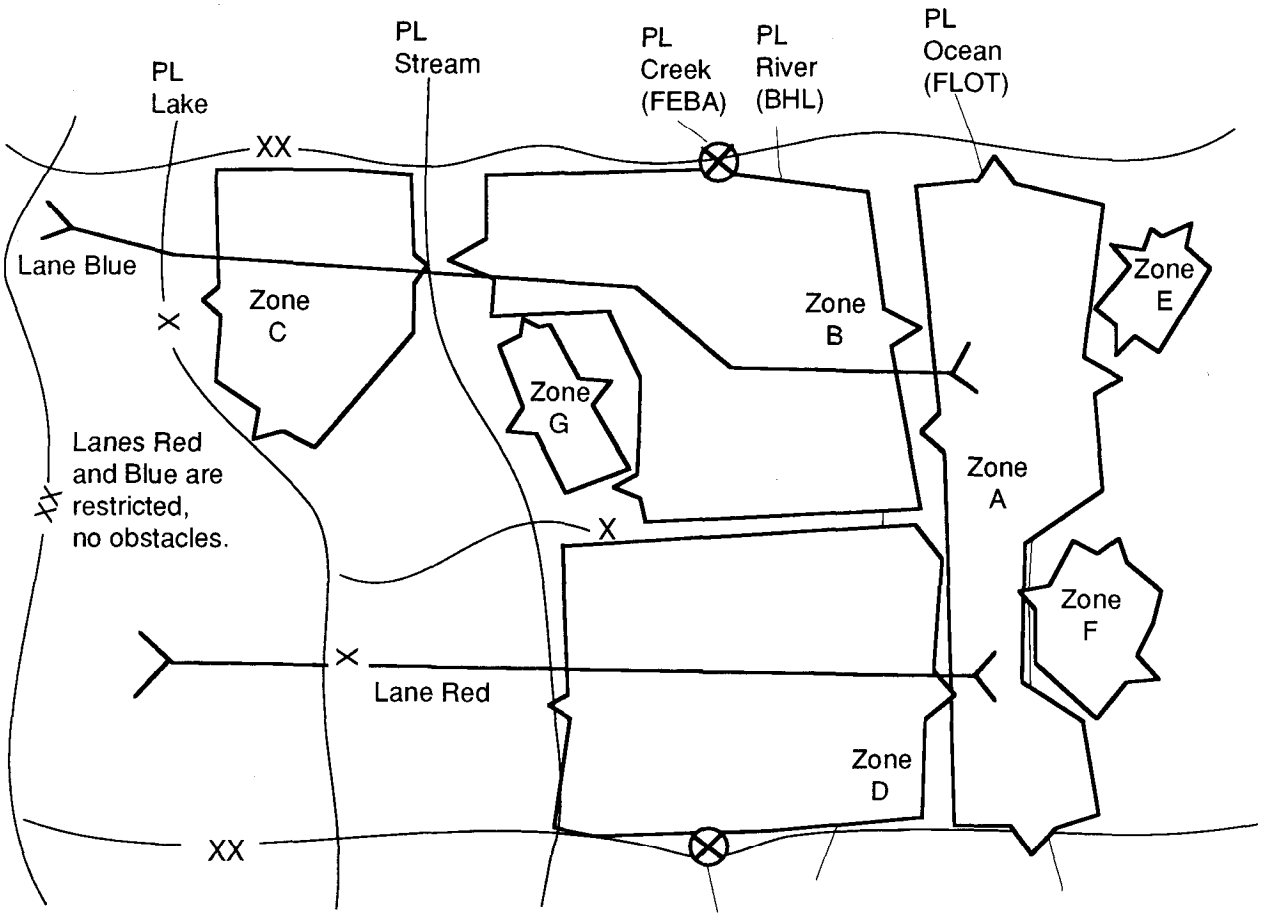


Figure 4-8. Division obstacle overlay.

combat units. Protective obstacles are important for ensuring survivability of CSS assets in the rear. The staff determines that the major rear area threat is from air-inserted dismounted enemy troops. Therefore, the staff allocates wire and AP mines to the base cluster commanders.

OFFENSIVE OBSTACLE PLANNING

The following paragraphs provide special considerations and some tools for planning obstacles to support offensive operations. It is harder to plan obstacles to support offensive operations than to support defensive operations. In the offense, it is difficult to determine where obstacles will support the scheme of maneuver. In addition, most tactical obstacles are situational. Therefore, obstacle planning must result in a plan that is flexible enough to allow emplacement authority and ensure obstacle control during the fluid offensive operation.

TYPES OF OFFENSIVE OPERATIONS

There are certain obstacle-planning considerations that are dependent on the type of offensive operation. One common consideration is that offensive operations normally rely on situational obstacles due to the variety of actions that may occur. The types of offensive operations are—

- Movement to contact.

- Attack.
- Exploitation.
- Pursuit.

Movement to Contact

A unit conducts an MTC to develop the situation or to gain or regain contact with the enemy. The primary consideration for an MTC is anticipating actions during movement and requirements for maneuver and fire support when the unit makes contact. A unit conducting an MTC normally organizes with forward, flank, and rear security elements; an advance guard; and a main body. Considerations for planning obstacles in support of an MTC include using them to—

- Fix the enemy while the main body maneuvers (forward security element or advance guard).
- Assist in defeating enemy attacks (flank or rear security elements).
- Support a hasty defense.

Attack

Attacks defeat, destroy, or neutralize the enemy. The same fundamentals apply to all types of attacks, including hasty, deliberate, spoiling, CATKs, and raids. Considerations for planning obstacles in support of attacks include using them to—

- Attack reserves or CATK forces.
- Prevent defending forces from repositioning.
- Support the protection of friendly flanks during the attack.
- Support a hasty defense following the offense.

Exploitation

In exploitation, the attacker maintains offensive pressure to extend the destruction of the defending force. Considerations for planning obstacles in support of exploitation include using them to–

- Prevent enemy withdrawal.
- Provide flank protection.
- Assist in cutting enemy lines of communication (LOC).

Pursuit

The pursuit is the desired outcome of an attack or exploitation. The pursuit involves total destruction of a retreating enemy force. Commanders use air and ground assets to intercept, capture, or destroy the enemy. Considerations for obstacle planning in support of pursuit include using them to—

- Cut off enemy withdrawal routes.
- Allow the friendly force to fix and destroy the enemy.

TECHNIQUES FOR OFFENSIVE OBSTACLE PLANNING

There are two techniques for planning obstacle zones and belts to support the different types of offensive operations. They are to—

- War-game.
- Use a grid system.

War Game

War-game to determine the most likely areas where obstacles will support the scheme of maneuver, and then plan zones or belts in those areas. If requirements for additional obstacle-control measures arise, the staff quickly plans and disseminates the additional control measures. It can use this technique in obstacle planning in support of MTCs and attacks.

Figure 4-9, page 4-18, shows an example of obstacle zones developed to support an MTC. Obstacle Zone S supports the advance guard as it fixes the lead of a moving enemy force. As the advance guard assumes a hasty defense, the main body maneuvers to conduct a hasty attack against the flank of

the enemy force. Obstacle Zone T assists in protecting the flank of the main body. The use of the same technique to support a deliberate attack is shown in *Figure 4-10.* The unit plans Obstacle Zones A and B to support a hasty defense following seizure of its objectives. They also plan Obstacle Zone C to support the aviation brigade's attack on the enemy reserve or CATK force.

Use a Grid System

Use a grid system covering the entire AO. The grid system is defined by grid lines, PLs, and boundaries. This technique is useful for all offensive operations.

Figure 4-11 illustrates the grid-system technique. In this example, the staff develops a grid system that encompasses the

entire division sector. In this case, the staff uses PLs, grid lines, and boundaries. As the division crosses PL Puma (LD), the commander activates zones Alpha and Bravo to allow units to emplace obstacles to provide flank protection. No other proposed obstacle zone is active.

Based on the developing enemy situation, the commander orders the division to assume a hasty defense along PL Stallion and activates Obstacle Zones Delta and Echo. To allow a division CATK, the commander orders the areas of Obstacle Zones Delta and Echo north of the 45 east-west grid line to be obstacle-restricted areas. This technique allows the commander to grant obstacle-emplacement

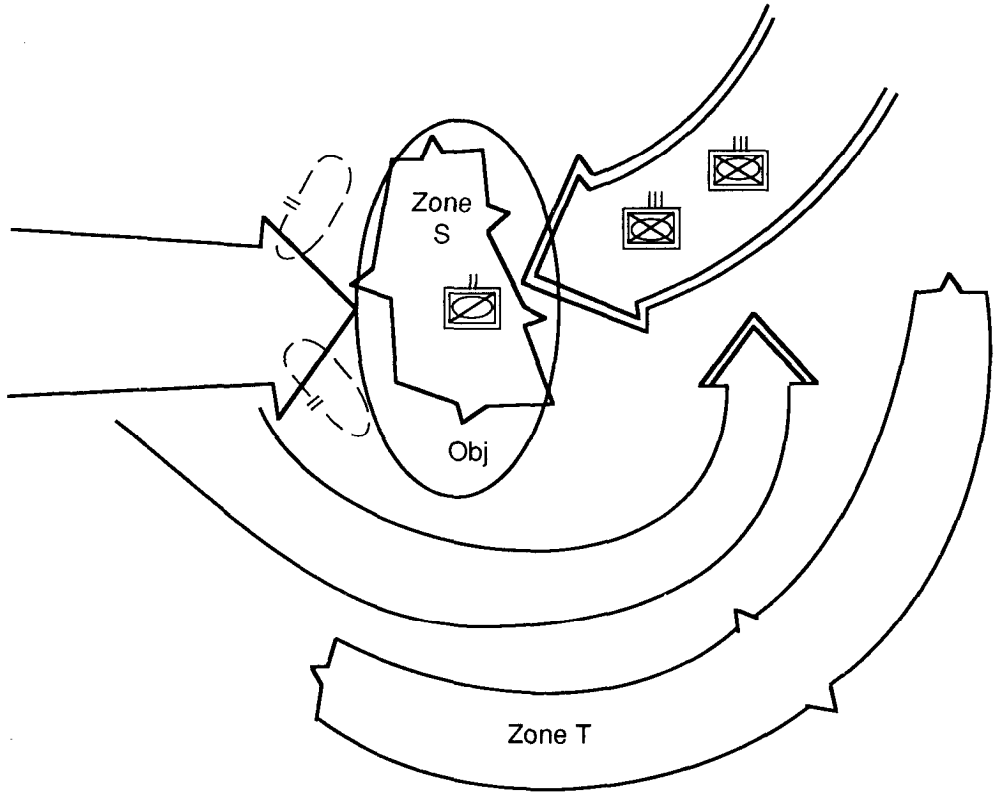


Figure 4-9. Movement to contact.

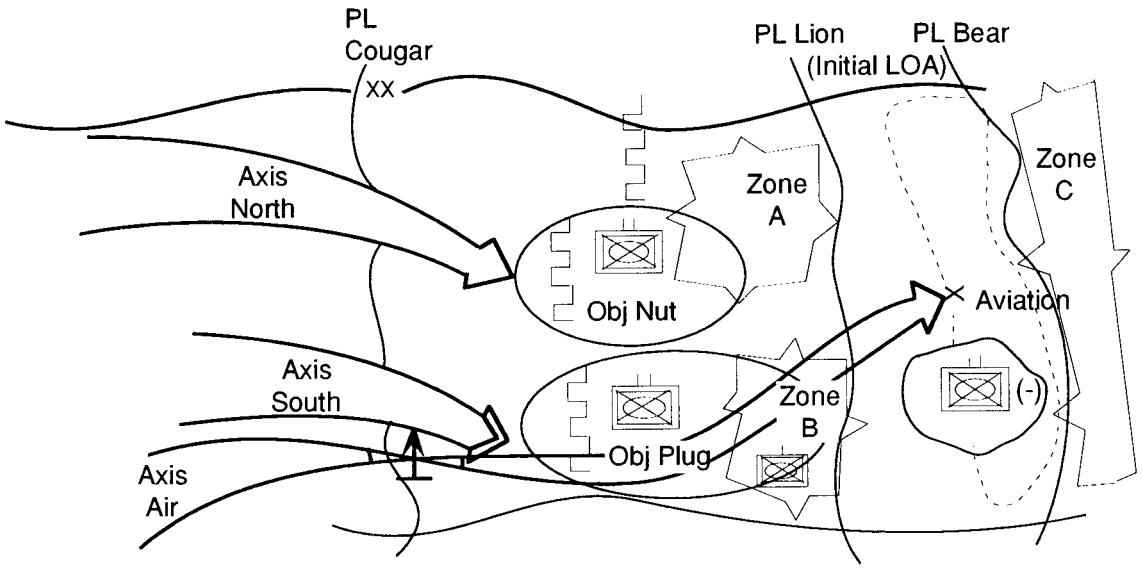


Figure 4-10. Deliberate attack.

authority and provide obstacle control despite a very fluid situation, using only one overlay.

This chapter focused on obstacle planning at the corps, division, and brigade levels. The de-tail at these levels ensures the right amount of obstacle control balanced with the maximum amount of flexibility for subordi-

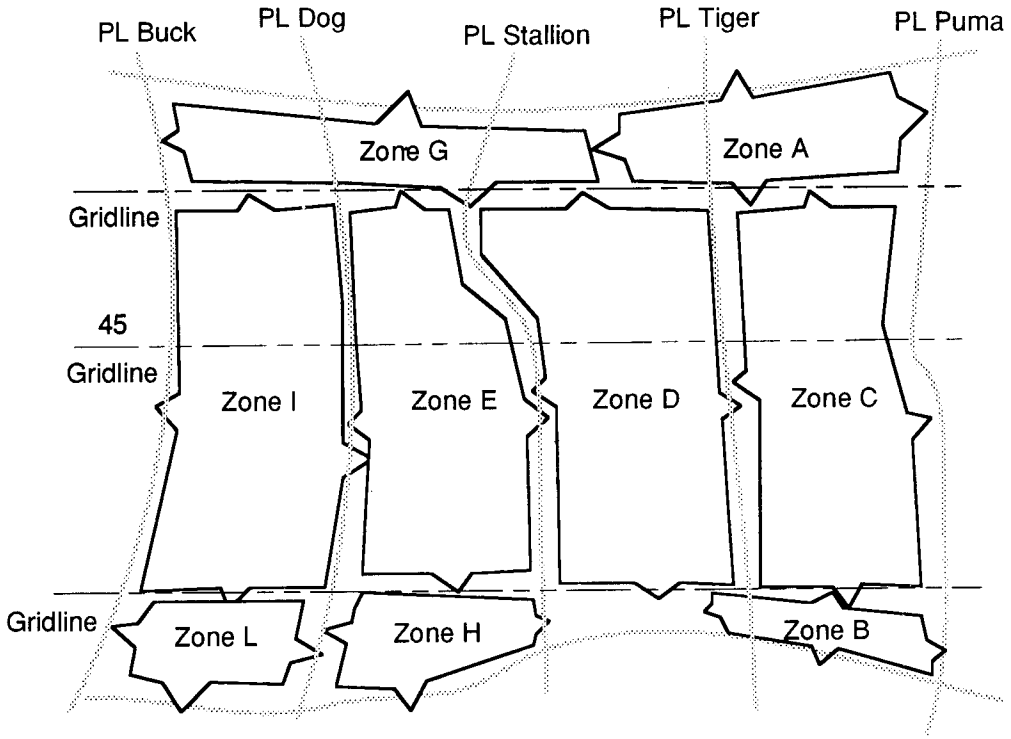


Figure 4-11. Grid system.

Chapter 5

Obstacle Planning at Task-Force Level and Below

The goal of obstacle planning is to support the commander's intent through optimum obstacle emplacement and integration with fires. The focus at the corps, division, and brigade levels is to grant obstacle-emplacement authority and provide obstacle control. The focus at the TF level and below is the actual integration of fires and obstacles. At the TF level, obstacle planning is very directive and detailed and centers on obstacle groups. Below the TF level, obstacle planning deals with the actual siting and emplacement of individual obstacles.

OBSTACLE PLANNING AT TASK-FORCE LEVEL

As with planning at higher levels, TF-level obstacle planning is part of the decision-making process. The following paragraphs provide techniques and considerations for obstacle planning integrated with the decision-making process.

MISSION ANALYSIS

The key activities during mission analysis are to—

- Determine the facts and develop assumptions.
- Analyze the higher HQ's mission and the commander's intent.
- Analyze the relative combat power.
- Issue the commander's guidance.

Determine Facts and Develop Assumptions

Obstacle planning begins with intelligence facts and assumptions, focused on the situation template (SITEMP). The SITEMP includes the modified combined obstacle overlay (MCOO). The MCOO is the basic product of the battlefield area evaluation, terrain analysis, and weather analysis from the IPB. It includes the combined obstacles overlay, AA overlay (with MCs), friendly operational graphic, key terrain, and known potential enemy objectives. Since tactical obstacles attack the enemy's maneuver and reinforce the existing terrain, the MCOO is vital to obstacle planning. It helps ensure that the obstacles correctly address the enemy AAs and MCs.

The SITEMP depicts an estimate of how the enemy will attack in terms of the size and the type of units and formations. The SITEMP should identify the probable locations where the enemy changes from a

march formation to a prebattle formation and finally to an attack formation. This information helps select how and what part of the enemy formation obstacles will attack and the effect the obstacles will have on the enemy's maneuver.

The SITEMP also may depict the likely routes for enemy reconnaissance elements. This helps determine requirements for R&S patrols that defeat enemy attempts to reconnoiter the obstacles and reduce their effectiveness before they attack.

The engineer provides information on current and projected engineer task organization and the capabilities of engineer units supporting the TF. In addition, he provides facts concerning SCATMINE systems that are available and specific information about his engineer equipment or obstacle materials that may not be known to the remainder of the staff,

The FSO provides information on artillery- or aircraft-delivered SCATMINEs that are available. The Supply Officer (US Army) (S4) identifies the quantity and location of obstacle material on hand, the transportation assets available for moving obstacle material, and the maintenance status of equipment that can contribute to the obstacle effort.

Analyze Relative Combat Power

The staff compares friendly and enemy combat power and identifies possible requirements for obstacles to help offset enemy advantages. The actual inclusion of obstacles normally occurs after COA development.

Analyze Higher Headquarters' Mission and Commander's Intent

The staff goes through each step of the analysis and identifies information that will impact on obstacle planning. The staff analyzes the brigade commander's intent to determine how he wants to use obstacles to support his concept of the operation and achieve the desired end state. Normally, the brigade commander will have given each obstacle belt a specific effect; thus, the commander's obstacle intent is clear. If the commander does not provide the specific effects for each obstacle belt, the staff must determine his intent from the context of the order.

The TF must identify the tasks and limitations received from the brigade. These might include obstacle belts with or without a specified effect. They also include restricted areas or restrictions on types of obstacles. Also, the brigade may specify obstacle groups (situational, reserve, or directed).

The available assets determine the total obstacle capability in the TF. Available assets include engineer units, SCATMINE systems (artillery, air, or ground), infantry units that can provide more manpower for obstacle emplacement, and trucks and utility aircraft for moving obstacle materials. Although not considered an asset, time is an important resource that the staff must consider as it continues planning. Delays in completing a plan can have a major negative impact on the obstacle effort.

Issue Commander's Guidance

The commander's initial planning guidance on obstacles should be as specific as possible. If the commander narrows the number of COAs, or if some aspect of the different COAs remains unchanged, he may provide specific guidance on obstacles in certain areas. Any head start that the TF can get in emplacing obstacles is helpful.

COURSE-OF-ACTION DEVELOPMENT

After the staff develops a COA, the detailed obstacle planning begins. The staff focuses

on three specifics when developing the obstacle plan to support the COA.

- Fires analysis.
- Obstacle intent integration.
- Obstacle priorities.

Fires Analysis

Fires analysis starts with reviewing the TF commander's intent. The staff examines how it can use obstacles integrated with maneuver in the COA to achieve the commander's intent.

The staff uses the COA that it normally depicts graphically on an overlay. The maneuver graphics include maneuver and fire-control measures. Fire-control measures indicate how and where combat forces will mass, shift, and lift fires to destroy the enemy. The staff should draw planning range fans for friendly weapon systems on the overlay. Combined with the fire-control measures, these range fans give the staff a feeling for where company teams can integrate obstacles with fires. Understanding the maneuver and fire plans and the organization of the EA are fundamental to integrating obstacles with fires.

Obstacle Intent Integration

Based on the TF commander's intent and the fires analysis, the staff determines locations for directed obstacle groups. It starts by giving the obstacle groups a battlefield placement to support the maneuver plan. This location is for planning and is adjusted on the ground.

Each directed obstacle group targets a specific enemy element based on the SITEMP. The staff normally allocates groups against enemy battalion-size MCs just as they allocate a company team to defeat an enemy battalion. Company team fire responsibility, therefore, drives the placement of obstacle groups.

The staff decides which specific effect each directed obstacle group must achieve. It plans obstacle groups to—

- Disrupt the enemy.
- Turn the enemy into areas where friendly units can mass fires.
- Fix the enemy in the EA and enhance fires.
- Block the enemy along an AA.

The staff integrates these directed obstacle groups (location, target, and specific effect (intent)) with the COA. It shows the obstacle groups on the COA overlay using the obstacle effect graphics. The staff draws the graphic to reflect the location of the obstacle group as accurately as possible.

Obstacle Priorities

The staff sets priorities for the directed obstacle groups that it placed on the COA overlay. The staff aligns the obstacle group priorities to support the TF direct-fire main effort. It numbers the obstacle effects graphics on the overlay starting with 1 and continuing in sequence. These piorities help to determine resource allocations and to ensure that units emplace the obstacles that are most critical to the overall plan first.

COURSE-OF-ACTION ANALYSIS

The staff conducts war gaming to determine which COA it should recommend to the commander. The staff should consider obstacles within the total context of the COA. However, some specific considerations for the staff during war gaming are—

- Enemy reactions at obstacle groups versus the desired obstacle effect.
- Enemy breaching capability that may make one or more varieties of individual obstacles preferable (see *Appendix A).*
- Obstacle locations that inhibit friendly maneuver.

- Compatible obstacle effects and weapon system capabilities.
- Adequate fire-control measures to support obstacle effect.

After war gaming, the staff adjusts the COA to include the obstacle plan. These adjustments may include the following:

- Changes to locations of directed obstacle groups.
- Changes to the obstacle effect at a specific location.
- Addition of situational obstacle groups (see *Chapter 6* for specific considerations).
- Addition of reserve obstacle groups (see *Chapter 7* for specific considerations).
- Identification of other mobility requirements.

Mobility Requirements

The staff identifies mobility requirements to determine which obstacles need lanes or bypasses available for friendly forces. Lanes and bypasses are normally required for tactical repositioning, C2, and sustainment traffic. The staff identifies locations for lanes and bypasses based on tactical repositioning from the maneuver graphics, such as a route, axis, or subsequent position. It also identifies C2 mobility requirements, to include plans for rehearsals and physical placement of TRPs. Lastly, the staff identifies lanes and bypasses that are needed to support sustainment traffic. Considerations are the MSRs into and through the TF area, the TF logistics release point (LRP), the routes the company team takes from its position to the LRP, and the location of key TF logistics nodes.

Obstacle Design and Resourcing

After comparing the COAs and determining the COA for recommendation to the commander, the staff can conduct more detailed planning for the obstacle plan that supports that COA. Specifically, the staff can determine the tentative design and resourcing for the obstacle plan. Final design and resourcing occurs after the commander approves the COA and any final changes. In fact, final design normally occurs at the company team and emplacing unit level. Nevertheless, the staff can develop a detailed concept that will require only minor modifications to support the final approved plan.

The staff begins by resourcing the groups based on the MC widths and the desired effect. It determines MC widths from the SITEMP. The total amount of linear obstacles required in a particular group is equal to the width of the MC multiplied by the resource factor for the obstacle effect, *Appendix C* explains resourcing in detail, The TF staff resources the obstacle groups according to the obstacle group priorities. Once the staff resources the obstacle groups, the engineer plans the individual obstacles.

Use of standard obstacles supports resource planning and obstacle group design. The plan for the individual obstacles, which make up a group, serves as a guide for the TF staff to adjust the resource allocation. If time is available for detailed reconnaissance, the design of the group may provide the company teams the actual obstacle design for each group. However, the design of the obstacle groups usually serves as a guide to company teams, and they conduct the actual design of the individual obstacles with the emplacing unit leader.

DECISION AND EXECUTION

Once the commander selects a COA, the staff completes the plan and publishes the order. The staff makes final adjustments to the plan and provides subordinate units with oral, written, and graphical information, with sufficient detail to allow the

subordinates to conduct the operation. The TF staff normally gives information concerning obstacles to subordinates using two tools. They are the—

- Scheme-of-obstacles overlay.
- Obstacle-execution matrix.

Scheme-of-Obstacles Overlay

The scheme-of-obstacles overlay depicts the location of obstacle belts, brigade obstacle groups (if any), and TF obstacle groups, within the TF sector. It also includes obstacle restrictions from any higher level (the staff annotates restrictions that it cannot show graphically). The overlay portrays obstacle groups using an obstacle-effect graphic. These obstacle graphics define the general location and the effect to be achieved by individual obstacles.

The obstacle overlay does not normally depict individual obstacle locations. However, the staff may depict individual obstacles if detailed reconnaissance has been done and exact obstacle locations are identified. Alternately, the staff may include individual proposed obstacle graphics with the obstacle-effect graphic to guide the emplacing unit and the owning unit on the general configuration of the obstacle group. Commanders must exercise caution if they use individual proposed obstacles on an overlay. They must ensure that inexperienced subordinates do not attempt to emplace obstacles exactly as depicted on an overlay, instead of properly siting the obstacle. The TF scenario that follows includes an example of a TF obstacle overlay.

Obstacle-Execution Matrix

The obstacle-execution matrix includes specific instructions and detailed information concerning the obstacles on the scheme of obstacle overlay. Normally, there is a separate execution matrix for each type of tactical obstacle. Chapters 6 and 7 describe and provide examples of obstacle-execution matrices for reserve and situational obstacles respectively *Figure 5-1, page 5-6,* is an example of a directed obstacle-execution matrix.

As a minimum, a directed obstacle-execution matrix should include the following:

- Zone/belt/group designation and individual obstacle numbers (see *Appendix B).*
- Location (grid coordinates appropriate to the detail of the plan. This may be a center of mass grid for the group, start and end points of the group trace, or grid coordinates for individual obstacles, if known).
- Obstacle effect for the group.
- Priority for the group.
- Emplacing and owning unit.
- Location of any lanes and closure instructions or reference to a reserve-obstacle matrix, if appropriate.
- Material or assets allocated for the group (possibly listed by number of standard obstacles. See *Appendix A).*
- Location of the obstacle materials (the Class IV and Class V point or other site. See *Appendix C).*
- Any special instructions for each group.

TASK-FORCE OBSTACLE SCENARIO

The following scenario highlights some considerations for obstacle planning at the TF level. The TF commander has the mission to defend in sector to defeat an enemy regiment. Based on the TF mission, the commander directs the staff to develop the COA depicted in *Figure 5-2, page 5-7.* The scouts will screen forward. Teams A and C and Company D defend from BPs A, C, and D, respectively, to mass fires in EA Tee. Team B defends along a secondary AA in the south from BP B. On order, Team B

Zone/Belt/ Group/ Obstacle Number	Location	Effect	Priority	Emplacing Unit	Owning Unit	Lane Location	Lane Closure* Responsibility	Materials/Assets Required	Materials Location	Special Instructions

* Reference to reserve-obstacle-execution matrix

Figure 5-1. Directed obstacle-execution matrix.

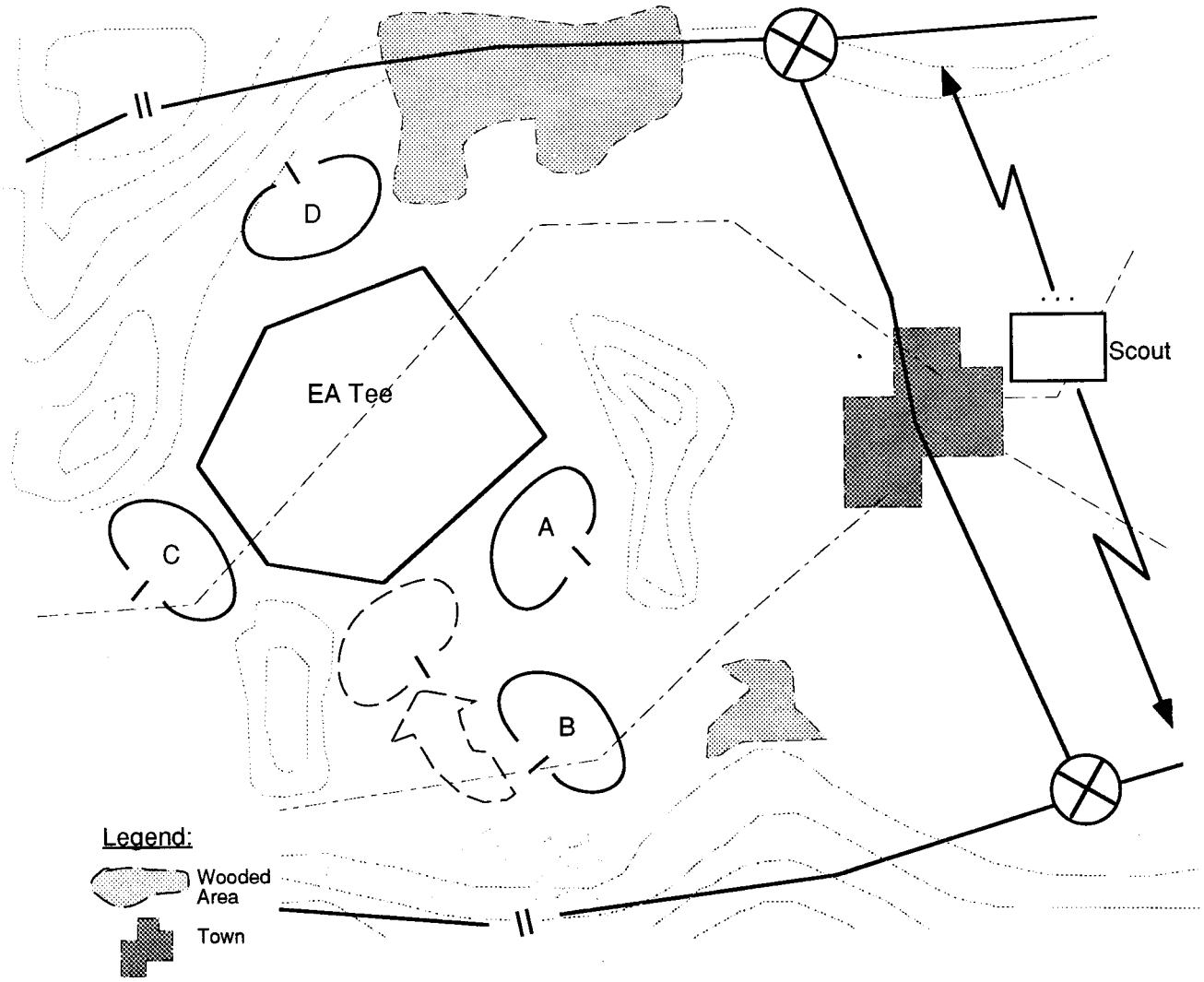


Figure 5-2. TF defense course of action.

repositions to a subsequent BP to support the fight in EA Tee.

The staff develops an obstacle plan to support the COA. First, it analyzes the fire plan to determine the areas where fires are massed to destroy the enemy. The staff sketches in rough range fans based on the probable weapon systems in each BP. These areas suggest locations where the staff can integrate obstacles with fires (see *Figure 5-3, page 5-8).* The staff selects locations for directed obstacle groups. It confines the obstacle group locations to obstacle belt A1, which it identified during mission analysis. The staff uses obstacle-effect graphics to show the relative location of the obstacle groups and indicate the desired obstacle effect. The obstacle groups target enemy battalion-size formations (see *Figure 5-4, page 5-9).* Finally, the TF staff sets priorities for the obstacle groups based on the importance of the obstacle group to the success of the COA. *Figure 5-4* also shows the priorities that support the commander's desire to stop the enemy in the south, force it to piecemeal into the EA, and destroy it in the EA.

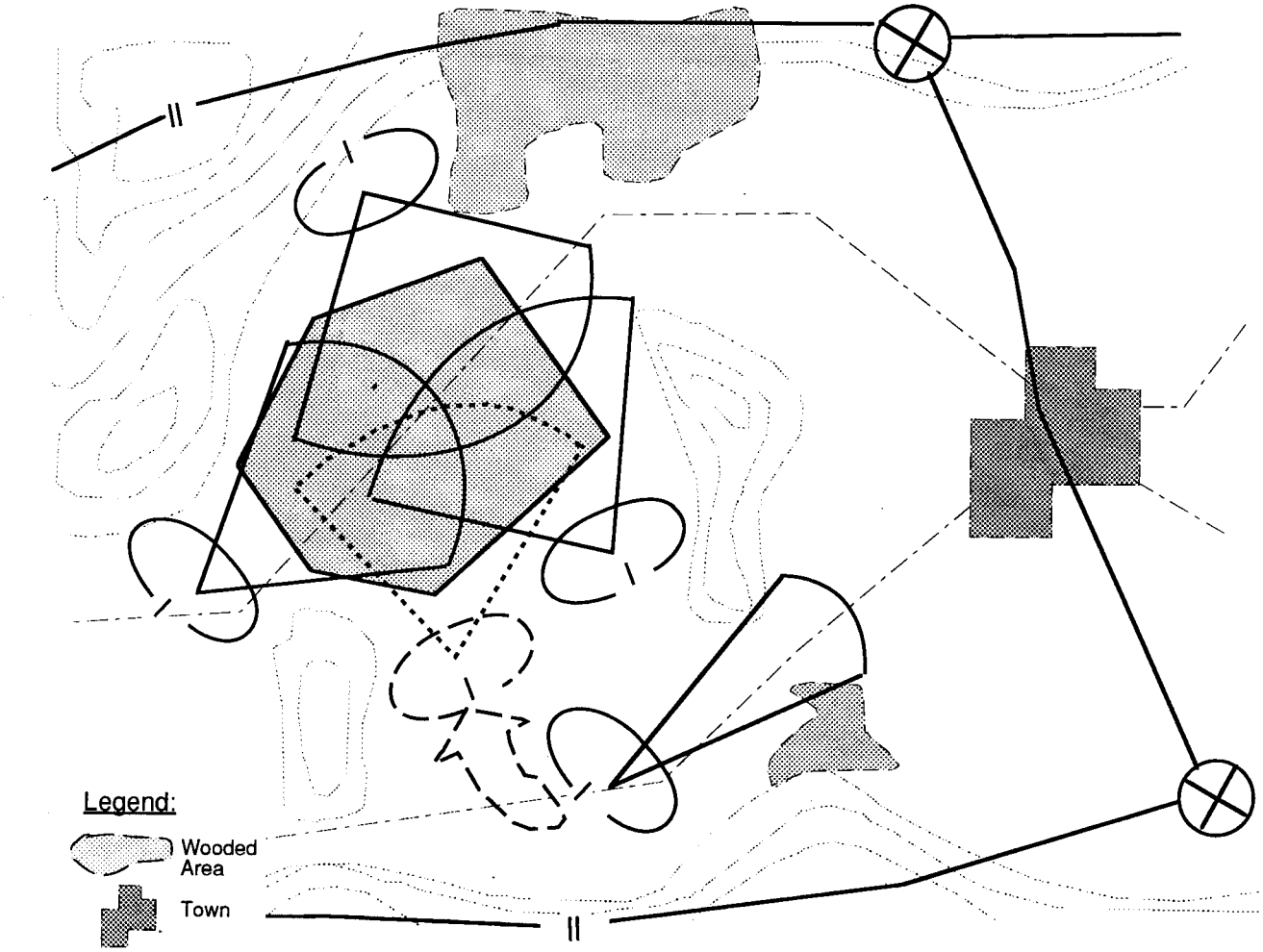


Figure 5-3. TF direct-fire analysis.

The staff analyzes the COA and makes adjustments based on the analysis. These adjustments include the addition of a situational obstacle group to support the withdrawal of the scouts. The staff also identifies mobility requirements. These requirements include lanes for passage of the TF scouts and marked bypasses in the EA to support EA rehearsals. *Figure 5-5, page 5-10,* shows the situational obstacle group and mobility requirements annotated on the obstacle plan.

The staff conducts obstacle design and resourcing for the obstacle plan. Obstacle resourcing to support an obstacle plan is discussed in *Appendix C.* The design of obstacle groups is discussed in *Appendix A.*

Following the commander's decision to accept the COA as it is, the staff finalizes the obstacle plan. The final plan includes a scheme-of-obstacles overlay (see *Figure 5-6, page 5-11)* and obstacle execution matrices.

OBSTACLE PLANNING BELOW TASK-FORCE LEVEL

The following paragraphs outlines principles for siting tactical obstacles to support the company team. The focal point is the coordination that must occur between the emplacing unit leader (normally an engineer platoon leader) and the company team commander. This coordination is perhaps

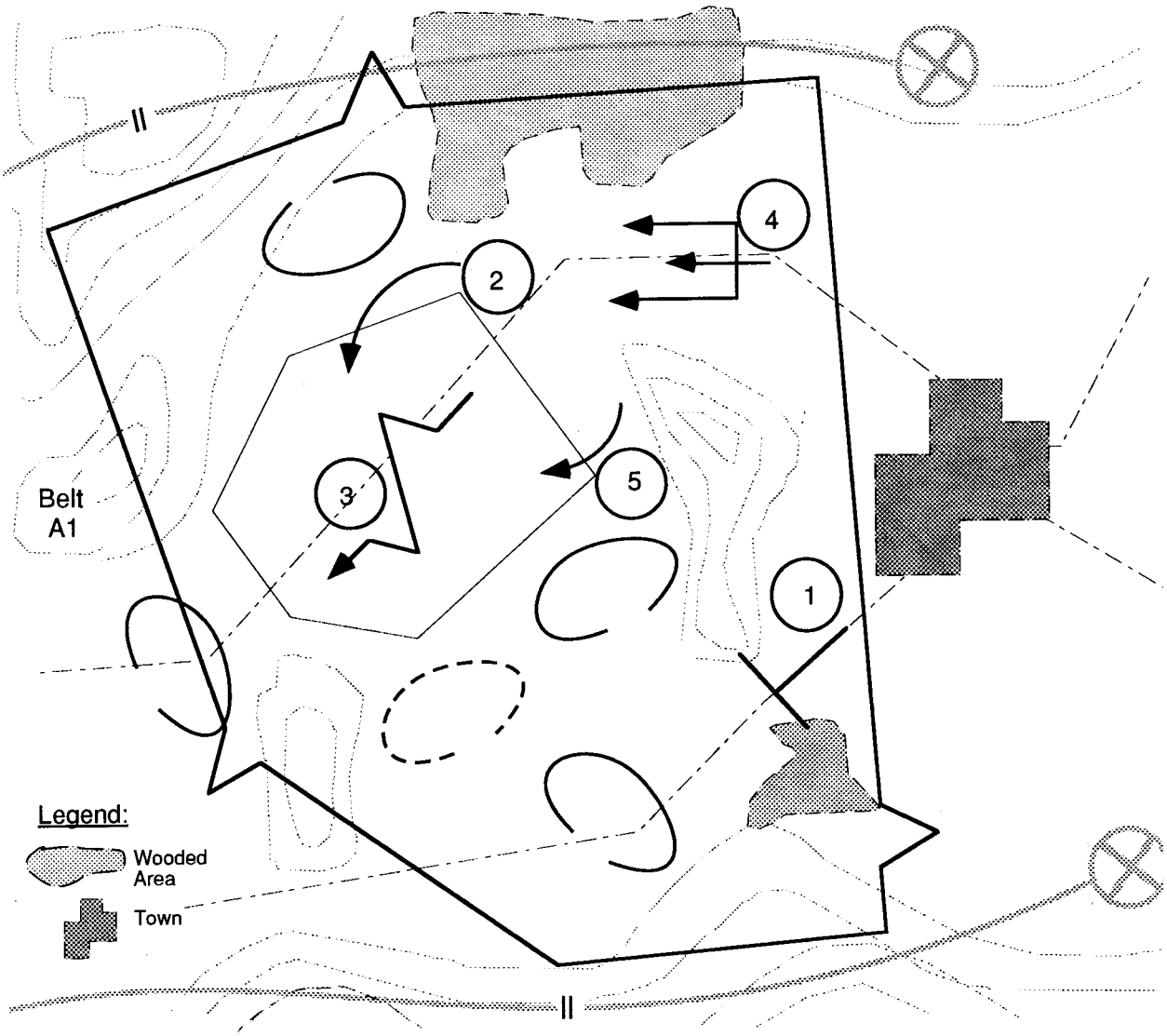


Figure 5-4. Obstacle intent integration and priorities.

the most vital component of effective obstacle integration. It is at this level that units directly integrate obstacles with the effects and capabilities of weapons and the fire plan. Once the coordination is complete, the emplacing unit physically sites the obstacle with the company team.

COORDINATION WITH THE MANEUVER COMMANDER

Effective coordination with the company team commander who is responsible for the obstacle group is essential to making the obstacles a combat multiplier. The emplacing engineer is the company team commander's team engineer for the mission. The engineer and the company team commander work closely to ensure complete integration of obstacles with the company team plan.

The emplacing engineer and company team commander use a common set of information when conducting coordination. The following tools or information will improve coordination:

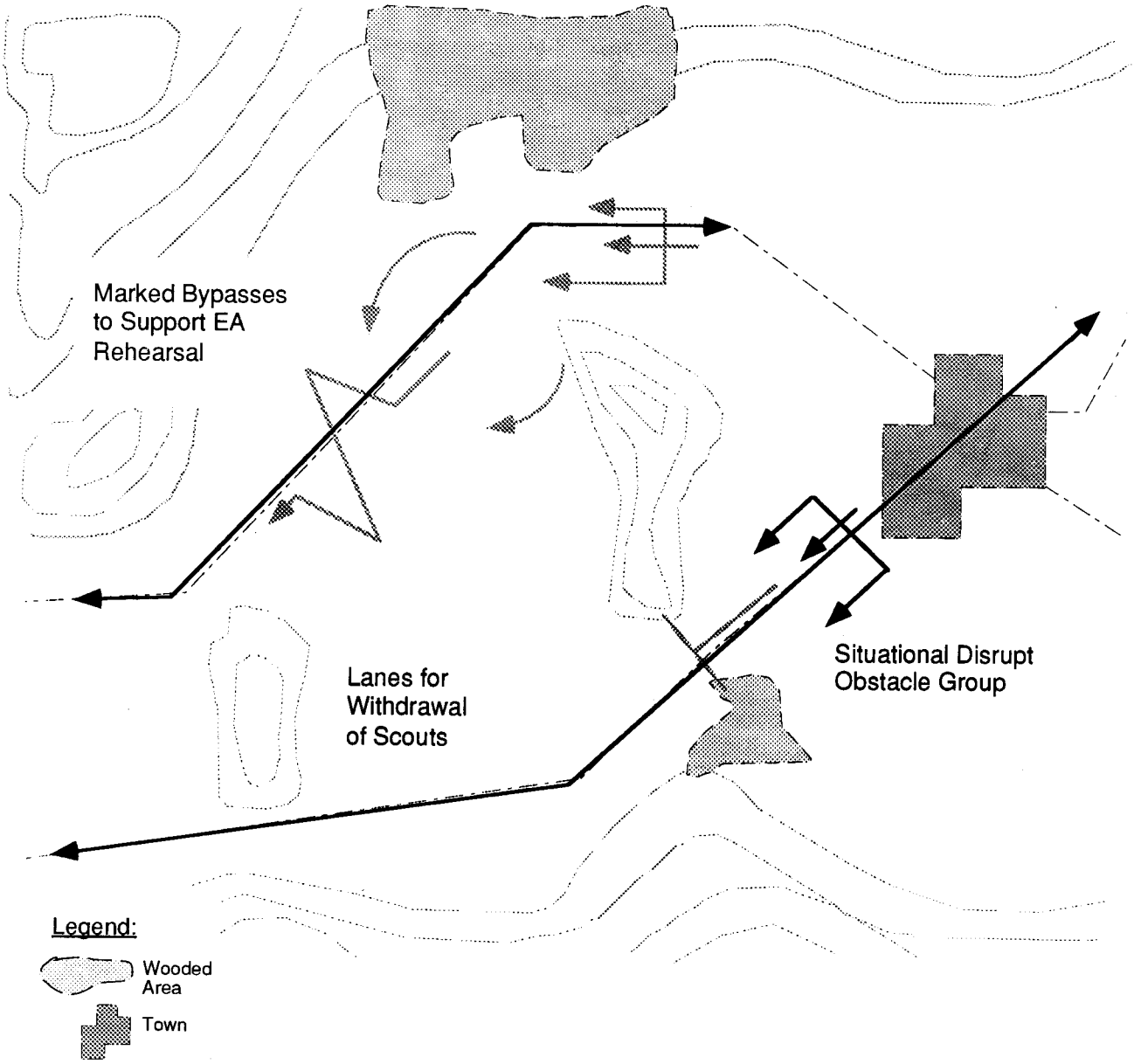


Figure 5-5. Obstacle plan refinement.

- SITEMP.
- Commander's intent.
- Maneuver graphics and fire plan.
- Obstacle execution matrix / matrices.
- Scheme-of-obstacle overlay.
- Fire-support plan.
- CSS graphics.

During coordination, a checklist or framework is a useful tool for organizing thoughts and formulating questions. *Table 5-1, page 5-12,* provides a checklist of some considerations for use during coordination between the emplacing engineer and the company team commander. These considerations are organized using the BOSs to provide a logical framework.

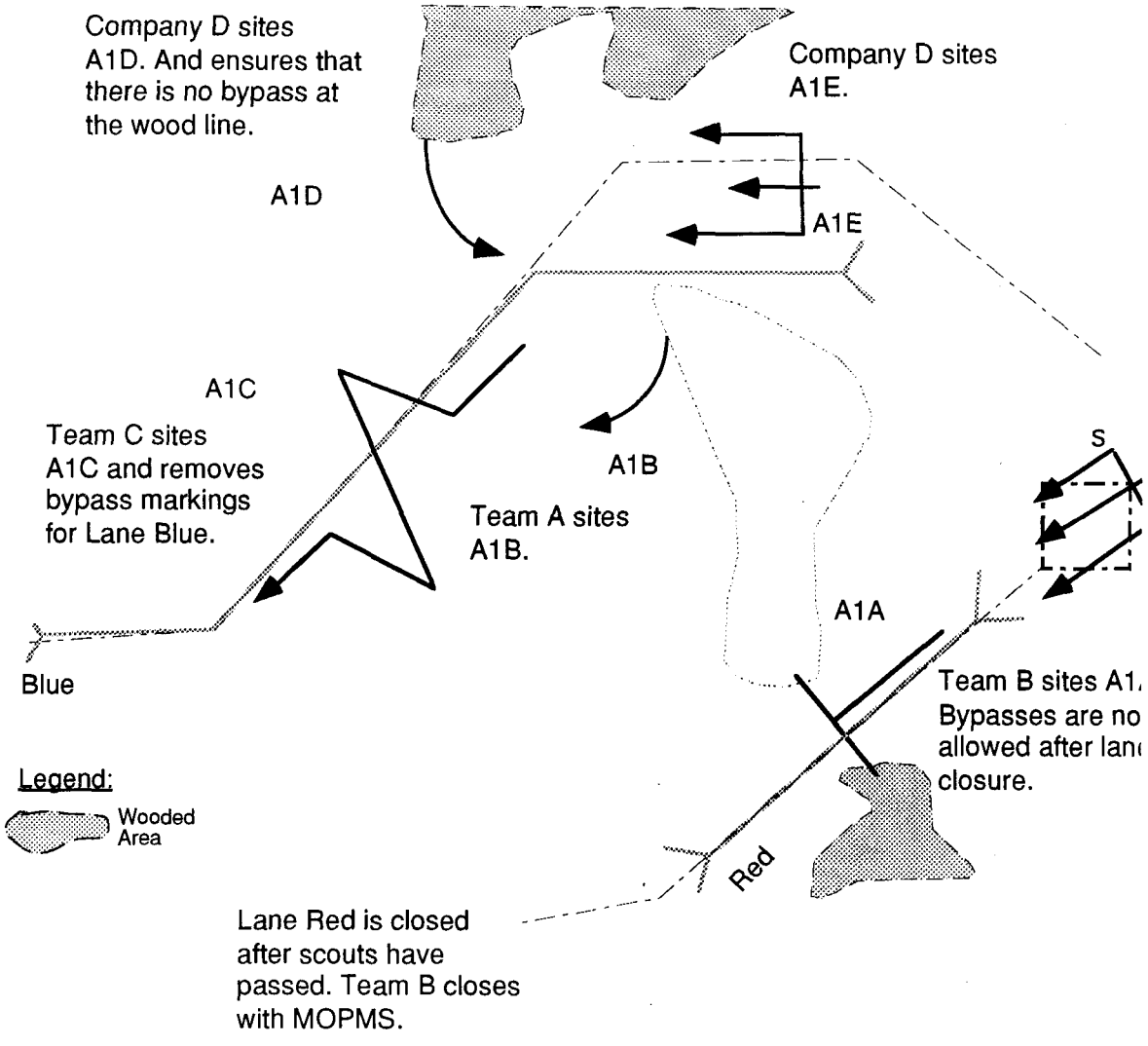


Figure 5-6. Scheme-of-obstacles overlay.

SITING THE OBSTACLE

The emplacing engineer and the company team commander site individual obstacles to achieve synchronization between the obstacle effect and fires. Both must devote sufficient time to the siting effort, since it represents the final adjustments to obstacle location and fire control before emplacement.

To site individual obstacles, certain preconditions are necessary. First, the company team commander decides where he plans to mass fires and marks the necessary fire-control measures on the ground. The location of these control measures must be clear since they are the basis for obstacle siting. Second, the commander identifies tentative locations for his key weapons within his position or sector. Finally, he and the engineer must both understand the intent of the obstacle group.

Obstacle siting concentrates on marking the obstacle group as a whole instead of each

Table 5-1. Obstacle-coordination checklist.

BOS	Considerations
Intelligence	• Enemy AAs and MCs (mounted and dismounted) • Likely enemy COAs and possible reactions to obstacles • Enemy breaching capability • Enemy reconnaissance routes, friendly counterreconnaissance or R&S plans, and company-team-level patrols • Likely enemy formations and transitions between formations
Maneuver	• Higher HQ commander's intent • Type of weapons and locations • Sectors of fire/location of TRPs • Mobility requirements for adjacent units, CATK axis and routes for repositioning, employment of reserves, and passage of lines • Obstacle-protection measures
M/S	• Obstacle intents (target, location, and obstacle effect) • Integration of obstacles and fires • Obstacle-control measures and restrictions from higher HQ • Obstacle marking to prevent fratricide • TF mobility requirements (lanes and gaps) • Mutual support between obstacle location, fire plan, obstacle effects, and survivability positions
Fire	• Artillery or mortar targets • Type of priority targets and FPFs • Plan for covering obstacle effects with indirect fires • Indirect-fire control measures to synchronize direct and indirect fires and obstacles • Fire registration plan (deconflict with obstacle emplacement) • Fire support, if enemy contact occurs during emplacement • ADAM/RAAM use (lane closure, repair breached obstacles)
Air Defense	• Location of the enemy air AAs during emplacement • Update on changes to air-defense warning and weapons status • Location of air-defense systems that can cover engineers emplacing obstacles • Method of obtaining early air-defense warning
CSS	• Tentative location of Class IV and Class V supply point within the company team position, if used, and the routes from the supply point to the obstacles • Routes the company team plans to use to conduct logistical package (LOGPAC) operations • Manpower assistance and materials handling equipment (MHE) at the Class IV and Class V supply point
C2	• Location of commander during defensive preparation • Frequency modulated (FM) net of the supported company team and the means of communication • Unit boundaries affecting obstacle emplacement • Time and place of company team order • Coordination that must occur with adjacent units • Obstacle reporting and recording requirements • Time and method of obstacle turnover • Lane-closure responsibilities and procedures

individual obstacle; however, in broken terrain, it may be easier to site individual obstacles. The company team commander and emplacing engineer use vehicles or soldiers from the company team, the engineer platoon, or both to simulate the enemy force and do the physical marking. The simulated enemy forces move into the EA to the enemy side of the obstacle group. The engineer platoon leader and the company team commander collocate near the weapons covering the obstacle. As a technique, one or all of the tanks, Bradleys or other crew-served weapons may occupy their position and contribute to the siting process. All participants in the siting process use a common FM net to communicate during siting.

The simulated enemy forces move into the EA simulating the enemy's attack. They deploy into a formation of similar frontage as the expected enemy formation. Once they are near the marked fire-control measures, they place markers at intervals as they drive the trace of the obstacle group effect (or individual obstacles in broken terrain). They remain oriented on key fire-control measures to ensure that the obstacle location and effect are synchronized with fires. During the process, each participant verifies that he can cover the obstacle, notes the location of fire-control measures and obstacles, and records the appropriate data on range cards. As the platoon drives the obstacle trace, siting participants also identify dead space and requirements to refine the location of the obstacle group and fire-control measures. The siting process also may identify the need for other fire-control measures. *Figure 5-7, page 5-15,* illustrates how the engineer and the company team commander work together to site a turn and a fix obstacle group respectively.

Once the company team marks the general limits and orientation of the obstacle group, the engineers can begin marking individual obstacles (if this has not already been done). To mark individual obstacles, the engineer platoon uses the group markers as a guide. As shown in *Figure 5-7, page 5-15,* the group markers may lend themselves well as the start and end points of individual obstacles; however, this is not always the case. As the engineer platoon refines the group limits into the site of individual obstacles, the platoon can then begin the necessary site layout based on the method of obstacle emplacement.

Siting is not the last thing done during preparations. The time and resources involved in emplacing tactical obstacles requires that siting begin concurrently with establishing the defensive position. It is imperative that the unit sites the obstacles as soon as the company team commander establishes the EA and identifies tentative positions for key weapons. It is not necessary that all weapons are in place and dug in before siting. Normally, well-marked fire-control measures and one known position per maneuver platoon (not dug in) are all that is required to effectively site the obstacles.

OBSTACLE TURNOVER AND TRANSFER

Once an obstacle group is completed, the emplacing unit conducts obstacle turnover with the owning unit. Occasionally, an owning unit will transfer responsibility for an obstacle to another unit. Obstacle turnover or transfer ensures that the commander of the owning unit is familiar with the obstacle and understands its responsibilities concerning the obstacle. Considerations for obstacle turnover and transfer are as follows:

- Mutual identity check (normally only for obstacle transfer).
- Briefing on local friendly and enemy situations.

- Description of the obstacle, to include location, type, marking, and composition.
  - Conventional- mine fields (types of mines, fuzing, and antihandling devices (AHDs)).
  - Scatterable minefield (types of mines, duration/SD time, and safety zone).
  - Other obstacles (booby traps and other hazards).
- Information on lanes, to include number, locations, marking, and closure plan or information on the reserve obstacle (if applicable).
- Coordination completed or still required with the FIST.
- Transfer of graphics and documentation (minefield records, demolition target folders, orders for the demolition guard, or other written records).
- Guidance on obstacle protection measures taken or required (counterreconnaissance, targeting enemy breachers, obstacle repair, or phony obstacles).

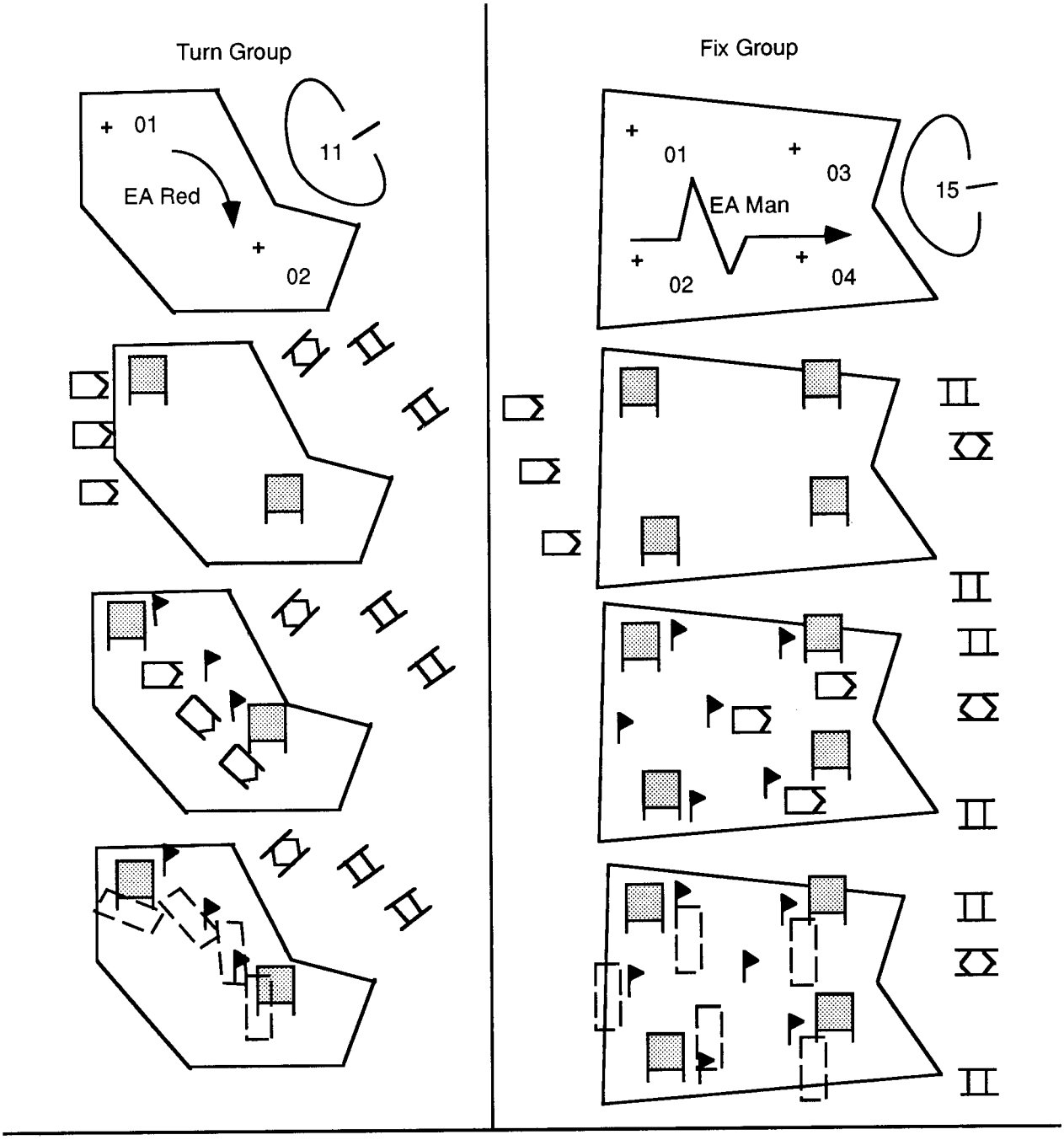


Figure 5-7. Obstacle siting.

Chapter 6

Reserve Obstacles

This chapter implements STANAG 2017.

This chapter outlines the procedures to plan, prepare, and execute reserve obstacle groups. Reserve obstacle groups are those for which the commander restricts execution authority. These are "on-order" obstacles, The commander specifies the unit responsible for obstacle emplacement, guarding, and execution. Units normally plan and prepare reserve obstacles during preparation of the battlefield. Units execute them only on command of the authorizing commander or based on specific criteria that the commander identifies. The purpose of a reserve obstacle group is to retain control over the mobility along an AA. Commanders use reserve obstacles when failure to maintain control over the mobility along an AA will have disastrous effects on the current battle or future operations.

EMPLOYMENT PRINCIPLES

Commanders carefully select and have their staffs plan reserve obstacles. Normally, the commanders assign a maneuver unit as a guard element to protect the reserve obstacle site. They also commit an engineer unit to provide the technical expertise to ensure that the obstacle is executed. Both the maneuver and engineer units that the commander dedicates to the reserve obstacle have other potential missions. The commander must conclude that the reserve obstacle group is so critical that the loss of units to protect and execute the obstacle outweighs the combat potential of those units in other areas.

The commander must clearly identify the criteria for executing the obstacle. Reserve obstacles require detailed coordination and synchronization to ensure success.

Units normally install, but do not execute, reserve obstacles early in the preparation phase because they are a critical part of the plan. Units may use a reserve obstacle to close a lane in a larger obstacle. Obstacles used for rapid lane closure are often demolition obstacles or mines; however, the type of obstacle used is only limited by imagination and ingenuity.

RESPONSIBILITIES

Key persons involved in the execution of a reserve obstacle (see *Figure 6-1, page 6-2)* are the—

- Authorizing commander.
- Guard commander.
- Firing commander.

AUTHORIZING COMMANDER

The authorizing commander is the maneuver commander who determines the requirement for a reserve obstacle. The authorizing commander—

- Establishes the criteria and procedures for executing the obstacle. Typically, he withholds authority to execute until he gives the order, using specific code words.
- Selects the code words for the execution of the obstacle.
- Establishes other specific criteria for executing the obstacle if he does not withhold the execution authority. He may authorize the guard commander to execute the target based on his own initiative or based on other criteria.
- Determines the need for a separate guard force. If a small guard force can protect the obstacle site, he may choose to combine the duties of the guard force and the firing party. In this case, the guard commander and the firing commander are the same person.

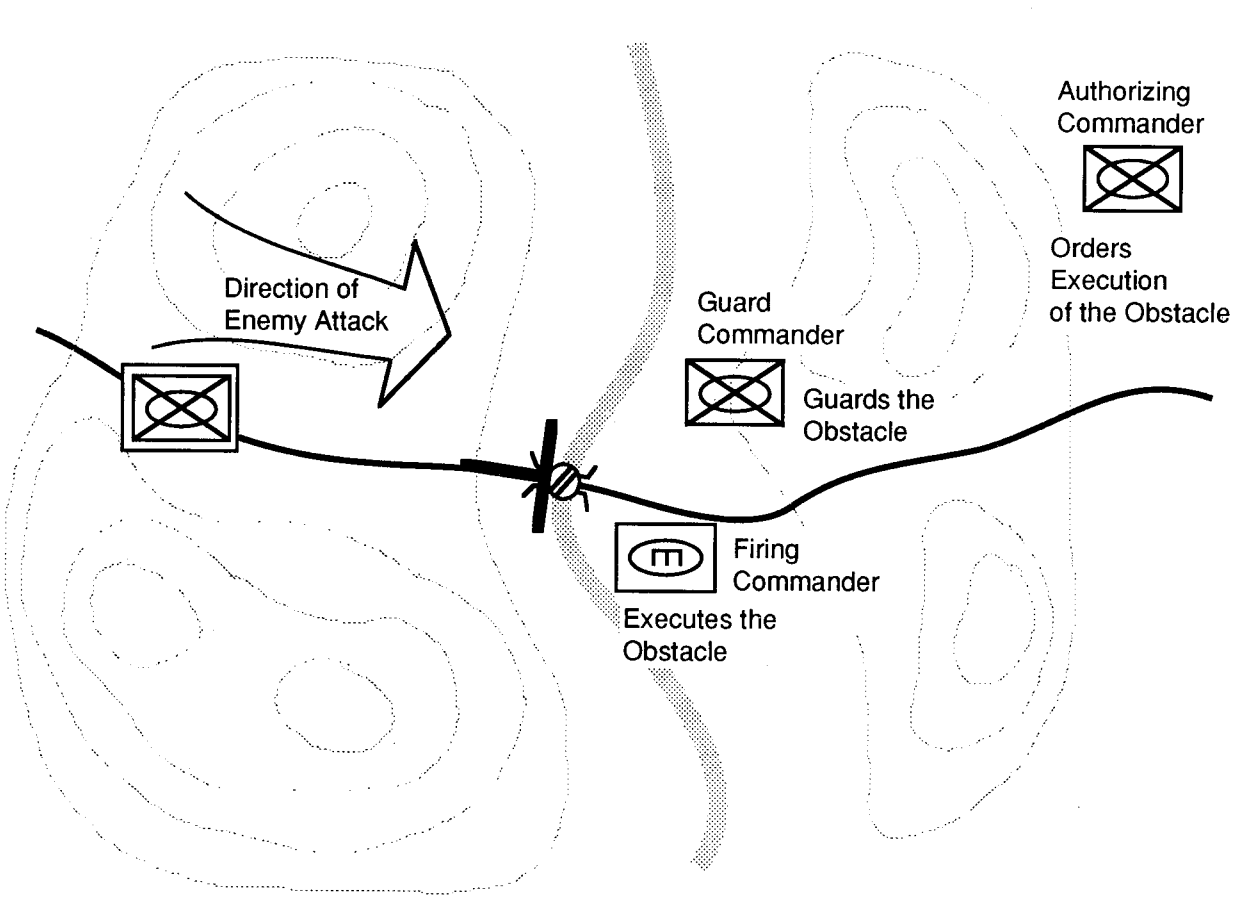


Figure 6-1. Reserve-obstacle responsibilities.

- Determines the need for a separate firing party. If the reserve obstacle requires an engineer technical expert on site to ensure obstacle execution, then the firing party is separate from the guard force.

GUARD COMMANDER

The guard commander is the leader of the unit that protects the obstacle. He is a commissioned officer or an NCO. The guard commander—

- Ensures that the obstacle site is not captured by the enemy.
- Gives the firing commander the order to execute the obstacle (based on the criteria that the authorizing commander established).

FIRING COMMANDER

The firing commander is the leader of the firing party and is an engineer NCO, unless the commander determines that there is no need for an engineer technical expert on site. The firing commander—

- Executes the obstacle when the guard commander orders him to do so.
- Inspects and repairs the obstacle, as required.

The specific orders to the guard and firing commanders are shown on the sample STANAG Form 2017 (see *Figure 6-2, pages 6-4* and *6-5*.

RESERVE-OBSTACLE PLANNING CONSIDERATIONS

The staff plans reserve obstacles during the decision-making process. The following paragraphs contain some considerations for determining the requirement for, and the planning, preparation, and execution of, reserve obstacles.

The commander determines the requirement for a reserve obstacle during the COA analysis or possibly following the COA development. The commander may also receive a requirement for a reserve obstacle from a higher commander as a specified task. If so, the staff identifies the requirement during the mission analysis.

If the commander decides that he needs to retain control over mobility along an AA, he has two options. He can—

- Assign a specified task to a subordinate unit to maintain a lane.
- Use a reserve obstacle.

The commander must consider the effect of the premature loss of mobility along an AA. For example, if an ACR is withdrawing under pressure through a division sector, premature loss of mobility along the AA may slow or even stop the ACR's withdrawal. The corps commander may specifically task the division commander to ensure that the ACR's withdrawal lanes are clear until the ACR has withdrawn. Thus he allows the division commander to determine the need for reserve obstacles. The corps commander may also decide to use reserve obstacles (see *Figure 6-3, page 6-6).*

If the commander decides to use reserve obstacles, he again has two options. If specific obstacle sites are obvious, such as bridges across a major river, the corps commander may designate those sites as corps reserve obstacles. This will require detailed planning by the corps staff and coordination down to the executing unit. If obstacle sites are not obvious, the corps commander may specify that any obstacles along the withdrawal lanes are corps reserve targets. This will require subordinate units to conduct detailed planning and then coordinate through operational and engineer channels with the corps.

(Security Classification)

DEMOLITION ORDER
SERIAL NO
From CDR, 52ID
(Authorized Commander)

COPY NO_____ OF_____

1. Demolition Guard Commander
2. Demolition Firing Party Commander
3. Retained by the Authorized Commander
4. .....

PART I

1. Demolition Target Details:
   a. Description MINEFIELD W/TANK DITCH
   b. Location (grid co-ordinates) NV123456
   c. Target nickname, number, or codeword IO52000A0037
      (All orders are to be prefixed by target identifying nickname, number, or codeword.)
   d. Technical instructions .....

2. Executing Units:
   a. Demolition Guard 1st Bde, 52ID
   b. Demolition Firing Party 52 Engr Bn

3. Orders to the Demolition Firing Party Commander
   a. The demolition target is to be prepared to State of Readiness SAFE by 131600 NOV 93 (DTG).
   b. [ ] All other orders will be issued to you by the Demolition Guard Commander. Record their receipt in Part II.
   c. [ ] There is no Demolition Guard. You are to act as instructed in para 5, 6, and 7, recording the orders received in Part II.
      (Only one box is to be crossed)

4. Orders to the Demolition Guard Commander
   Your responsibilities are detailed in para IV. You are to act as instructed in para 5, 6, and 7, recording the orders received in Part II.

5. Demolition is to be fired:
   a. [ ] Immediately upon being prepared.
   b. [X] Upon receipt of codeword in para 8c by radio.
   c. [ ] Upon receipt of the order from the Authorized Commander or his Liaison Officer personally.
   d. [ ] (Other orders).....

6. Emergency Firing Orders
   a. [ ] You will NOT fire the demolition except as ordered in para 5.
   b. [X] You WILL fire the demolition on your own initiative if the enemy is in the act of capturing it.
      (Only one box is to be crossed)

7. Orders other than for firing will be given:
   a. [ ] By the Authorized Commander personally.
   b. [ ] By the Authorized Commander's Liaison Officer personally.
   c. [X] By radio.
   d. [ ] ..... (other means)

(Security Classification)
2

(Security Classification)

8. Codewords

Action to be taken	Codeword
a. Change from State 1 (SAFE) to State 2 (Armed)	RED
b. Change from State 2 (ARMED) to State 1 (SAFE)	GREEN
c. Fire the demolition now	GOLD
d. Para 3b cancelled, para 3c applies	PURPLE
e. Para 3c cancelled, para 3b applies	YELLOW
f. Para 5c cancelled, para 5b applies	ORANGE
g. The Authorized Commander is changed to 52ID	TAN
h.	
i.	

9. Authorized Commander
   Signature ..... Rank/Name .....
   Appointment ..... Date/Time Group .....

PART II

10. Changing State of Readiness:
    a. Time estimated by Firing Party Commander to change from State of Readiness 1 (SAFE) to State of Readiness 2 (ARMED) is 1 minutes.
    b.

State of Readiness Ordered	Originator	Date/Time Group of: Receipt of Order	Change Completed

11. Handover and Takeover of Demolition Target:

	Rank, Name, and Unit	Signature	Date/Time Group
Transferring Commander			
Accepting Commander			

(Security Classification)
3

Sample

Figure 6-2. Sample demolition order.

(Security Classification)

12. Record of Other Changes to Part I (if any)

Detail	Date/Time of Receipt

13. FIRE THE DEMOLITION NOW

Signed .....

(Rank, name, unit).....

(Date/Time Group) .....

(or enter date/time group of receipt of codeword in para 8c)

PART III

14. Demolition Report

a. Bridge b. Road/Runway/Railway

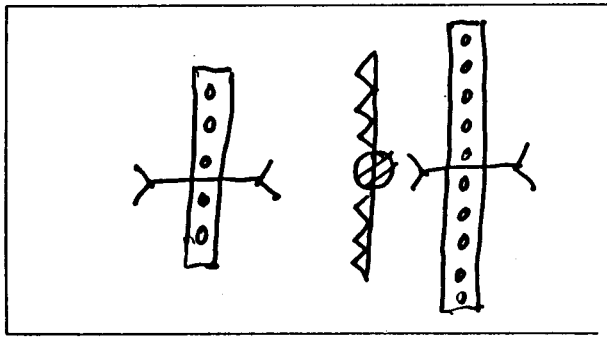
Estimated width of gap..... Number of craters.....

No. of spans down ..... Diameter/Depth.....

c. Other target .....

d. Mines laid: AT mines..... AP mines.....

Sketch



Signature _____ Rank/name/unit _____

(Security Classification)

4

(Security Classification)

ORDERS FOR THE DEMOLITION
(USAREUR Reg 525-2, STANAG 2017)

INSTRUCTIONS FOR PREPARING THIS FORM

I. Paragraphs 1-9 are to be completed, placing a cross in each box where applicable.

II. Copy No 1 is to be issued to the Demolition Guard Commander and Copy No 2 to the Firing Party Commander. Copy No 3 is retained by the Authorized Commander. If there is no Demolition Guard, Copy No 1 is issued to the unit providing the firing party.

III. If the Demolition Guard changes a new form should be issued.

ORDERS TO THE DEMOLITION GUARD COMMANDER

IV. You are responsible for:

a. Command of the Demolition Guard and Demolition Firing Party.

b. The security of the demolition site from enemy attack or sabotage, and the control of traffic and refugees at the demolition site.

c. Giving the order to the Demolition Firing Party Commander in writing (para 10 of Copy No 2) to change the State of Readiness.

d. Giving the order to the Demolition Firing Party Commander in writing (para 13 of Copy No 2) to fire the demolition.

e. Keeping the Authorized Commander informed of the operational situation at the demolition site.

V. The Demolition Firing Party Commander is in technical control of the demolition but you must insure that he keeps you informed of all action he takes. Your command post should be co-located with the firing point if possible.

VI. You are to find out from the Demolition Firing Party Commander the time required to change the demolition from State of Readiness 1 (SAFE) to State of Readiness 2 (ARMED), pass this information to the Authorized Commander and record it in para 10a.

VII. You are to nominate a deputy forthwith and compile a seniority roster. You are to insure that each man knows his place in the roster, understands his duties, and knows where to find this form if you become a casualty or are unexpectedly absent. The seniority roster must be made known to the Demolition Firing Party Commander.

VIII. Once State of Readiness 2 (ARMED) has been ordered either you or your deputy must always be at your command post so that orders can be passed immediately to the Demolition Firing Party Commander.

IX. In the event of a misfire or only partially successful demolition you are to give the Demolition Firing Party protection until such time as it has completed the demolition.

X. If you are ordered to hand over the demolition to another unit without the issue of a new form, para 11 is to be completed and the new form handed to the new Demolition Guard Commander. A receipt is to be issued and retained by you. If a new form has been issued, para 11 is to be completed on the old form which you will retain.

XI. When the demolition has been completed you are to report its effectiveness to the Authorized Commander by the fastest means available, and return Copy No 1 to him with para 14 completed.

XII. If you receive orders to fire the demolitions other than those given in para 5, you should refer to the to the Authorized Commander.

ORDERS TO THE DEMOLITION FIRING PARTY COMMANDER

XIII. You are in technical charge of the preparation, charging, and firing of the demolition.

ible for:

therefore under his command.

al Readiness.

on.

e siting of your firing point, which is ld be within sight of the target.

roster. You are to insure that each man e to find this form if you become a known to the Demolition Guard

ation to the Demolition Guard Commander.

ou or your deputy must remain at the

the demolition other than those given ediate superior.

hout the issue of a new form, para 11 is r Commander. A receipt is to be issued mpleted on the old form, which you will

ectiveness to your unit commander by pleted. If there is no Demolition Guard l to the Authorized Commander. If rd (STANAG 2036).

(Security Classification)

AE Form 1350, 1 Dec 81 Replaces AE Form 1350, 1 May 78, and AE Form 1350-1, which are obsolete.

Sample

NOTE: This is a sample only. Each unit must develop a Demolition Order locally (unless a suitable form is available from a higher HQ). The contents and paragraph numbers of the form must conform exactly to Annex A, STANAG 2017. The form should also conform as closely as possible, both in size and shape, to Annex B, STANAG 2017.

Figure 6-2. Sample demolition order (continued).

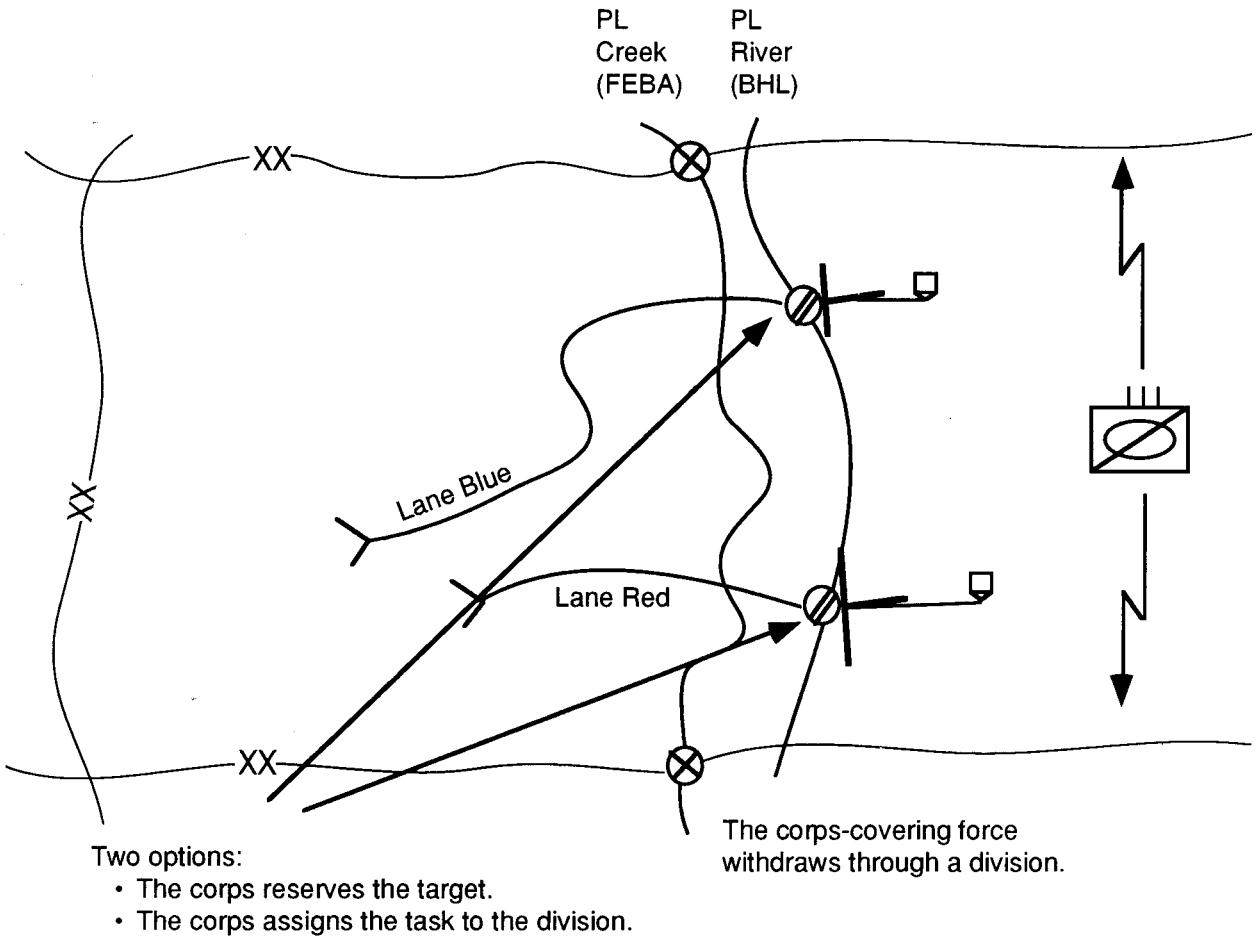


Figure 6-3. Considerations for using a reserve obstacle.

The need for reserve obstacles is not limited to ensuring successful rearward passage of friendly units. The reserve obstacle may control key terrain along a CATK axis that is along the most dangerous enemy AA (see *Figure 6-4).* Control of the key terrain (a choke point) along the CATK axis may be critical to success in the battle. The commander may reserve the obstacle controlling the key terrain to retain his flexibility to commit the CATK force along the axis and have a means to close the AA if the enemy uses the most dangerous AA.

ADDITIONAL FACTS AND ASSUMPTIONS

Once the commander decides on the need for a reserve obstacle, the staff examines the SITEMP. It is used to determine the–

- Size of the guard force required.
- Requirement to secure the obstacle, either by fire or occupation.
- Size of the obstacle required.
- Most effective type of obstacle.

The expected threat determines the size of the guard force. The enemy and terrain

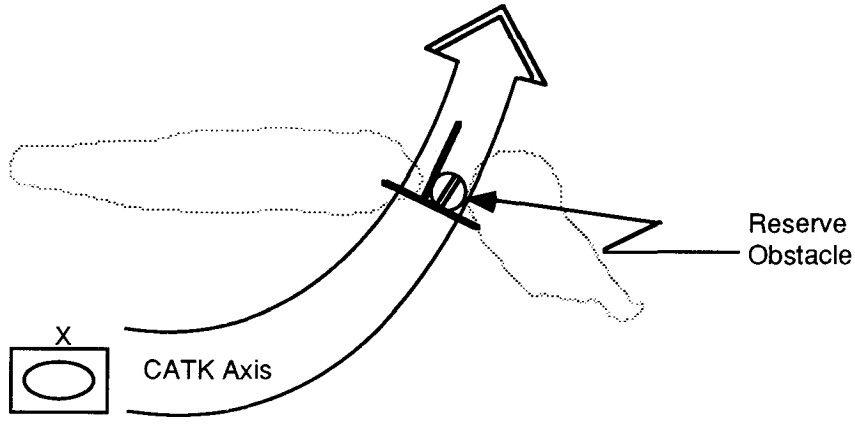


Figure 6-4. Using a reserve obstacle to control key terrain.

situation dictate whether the guard force must secure the site by occupation or whether they can do so from a distance by fire. The terrain that determines the size of the AA may determine the size of the obstacle. The enemy's breaching capability may determine the most feasible obstacle. For example, if the enemy does not have organic assault bridging, then tank ditches and RCs may be the best obstacle.

FIRES ANALYSIS

The staff analyzes the COA to determine the—

- Location of the obstacle relative to subordinate units' positions.
- Ability of the unit to cover the reserve obstacle group by fire following execution.
- Most likely subordinate unit to assign to the guard force mission.

The best spot for an obstacle may not be the best spot to bring overwhelming combat power to bear. When the unit uses the reserve obstacle to close a lane in a properly planned directed obstacle, the reserve obstacle is already integrated with fires. However, in some cases, a reserve obstacle site is dictated by a higher commander or the terrain. A reserve obstacle directed by the higher HQ may require the subordinate unit to adjust its positions to cover the obstacle by fire. In some terrain, there may be only a few sites where a commander can use reserve obstacles to control mobility along an AA. This terrain is usually dominated by some type of existing obstacle (such as a river, canal, or canyon). If the commander decides to use a reserve obstacle, he repositions forces to ensure that the obstacle is covered by fire.

OBSTACLE INTENT INTEGRATION

The staff places the reserve obstacle group relative to the terrain and friendly maneuver graphics to support the COA. Normally, the desired obstacle effect of a reserve obstacle is to block. Even if it is used to close a lane in a directed fix obstacle group, the commander uses the reserve obstacle to block the AA, in this case the lane; however, the commander may use reserve obstacles to achieve any of the four obstacle effects. The staff indicates the location of reserve obstacles by using the obstacle effect graphics and annotating them as reserve obstacles.

OBSTACLE PRIORITIES

Reserve obstacles are high-priority obstacles. Because a reserve obstacle is critical to the plan, units must emplace reserve obstacles early in the preparation phase.

MOBILITY REQUIREMENTS

The commander's decision to use reserve obstacles is based on—

- Analysis of the COA.
- Detection of mobility requirements.

An additional consideration is the establishment of procedures for traffic control and lane marking. *Figure 6-5* shows a possible lane-marking system based on lane-marking guidance from *FM 90-13-1.*

After the commander decides on a COA, the staff can do the detailed planning for reserve obstacles. This detailed planning involves designing and resourcing the reserve obstacle group.

OBSTACLE DESIGN AND RESOURCING

The staff determines—

- What obstacle assets are available.
- Which type of obstacle asset is best to use.

The staff must know the obstacle emplacement assets that are available. It finds this information by reexamining the facts and assumptions for the mission. The staff limits its consideration of available assets to those that are quickly executed. Demolition obstacles, preconstructed obstacles (like the falling blocks used in Korea), and SCATMINEs are examples of easily executed obstacles. For small lanes, hand-emplaced conventional mines may be suitable. If the commander decides to use SCATMINEs, the staff ensures that the asset directed to emplace the reserve obstacle is available for the mission at the required time. The obstacle-emplacement unit is dedicated to the reserve obstacle, which makes it an "on-order" mission. The staff identifies potential situations where SCATMINE assets may not be available and ensures that the commander understands any risk associated with their nonavailability.

DECISION AND EXECUTION

The staff prepares orders and provides mation on reserve obstacles on the SCI of-obstacles overlay, in a reserve-obstacle-execution matrix, and in a demolition order for the unit with the guard force mission.

SCHEME-OF-OBSTACLES OVERLAY

Reserve obstacles are included on the scheme-of-obstacles overlay. The staff uses the obstacle effects graphics and, in many cases, the individual obstacle symbols (if the commander intends to use a specific type of individual obstacle for the reserve obstacle). This provides the emplacing unit with clear guidance on what obstacle effect is desired and what individual obstacles to use.

OBSTACLE-EXECUTION MATRIX

The obstacle-execution matrix for reserve obstacle groups is similar to the matrix for directed obstacles (see *Figure 6-6, page 6-10).* Typical information shown on the matrix includes—

- Zone/belt/group designation and individual obstacle numbers.
- Location, effect, and priority of the group.
- Emplacing and owning units.
- Designation of the firing and guard commanders.
- Emplacing asset and asset location.
- Any special instructions for each group.

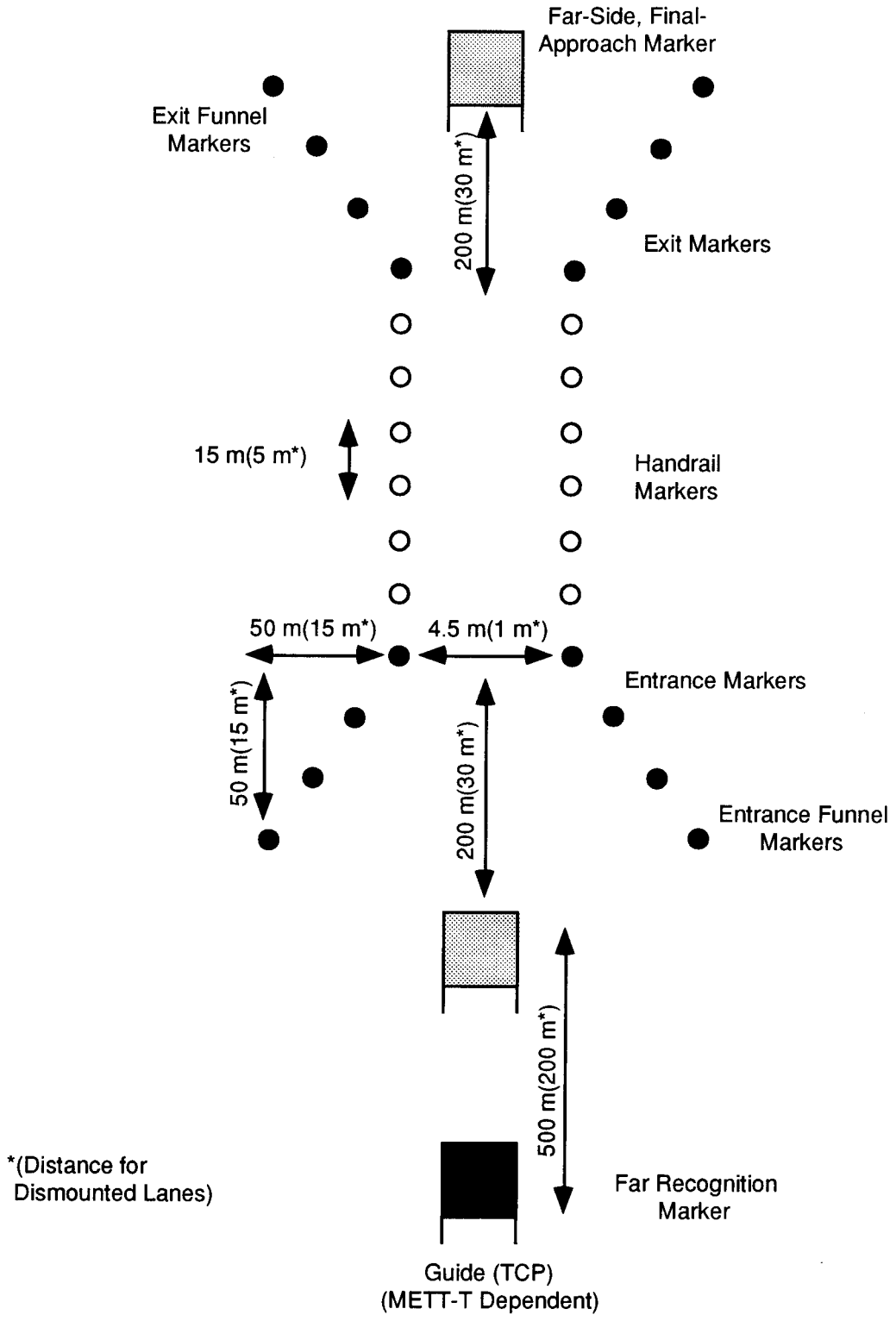


Figure 6-5. Lane marking.

Zone/Belt/ Group/ Obstacle Number	Location	Effect	Priority	Emplacing Unit	Owning Unit	Firing Commander	Guard Commander	Emplacing Asset	Emplacing -Asset Location	Special Instructions

Figure 6-6. Reserve-obstacle-execution matrix.

DEMOLITION ORDER

The demolition order, *STANAG Form 2017,* consists of a single sheet printed on both sides. This order can be used for any obstacle, not just demolitions. *Figure 6-2, pages 6-4 and 6-5,* includes an example of a completed demolition order.

The demolition order may include emergency firing orders (indicated on *STANAG Form 2017,* items 5 and 6). The commander performs a risk assessment on the execution criteria. The commander has two options: withhold execution authority or grant execution authority to the guard commander based on—

- The possibility that the enemy is about to capture the obstacle.
- A NLT time being reached.
- Specific friendly action.
- Specific enemy action.
- The combination of an enemy and a friendly action.

If the commander does not establish emergency firing orders, he takes the risk of the enemy destroying the guard unit and the obstacle not being executed. If he establishes emergency firing orders, he takes the risk that the premature execution of the obstacle may hamper future operations. The commander makes a decision on execution criteria and issues clear orders concerning the authority to execute the obstacle (see *Figure 6-7).*

REHEARSALS

Once the order is published, the next step is to rehearse the execution of the obstacle. Reserve obstacles require detailed coordination and execution. The focus of the rehearsal is to confirm the timing

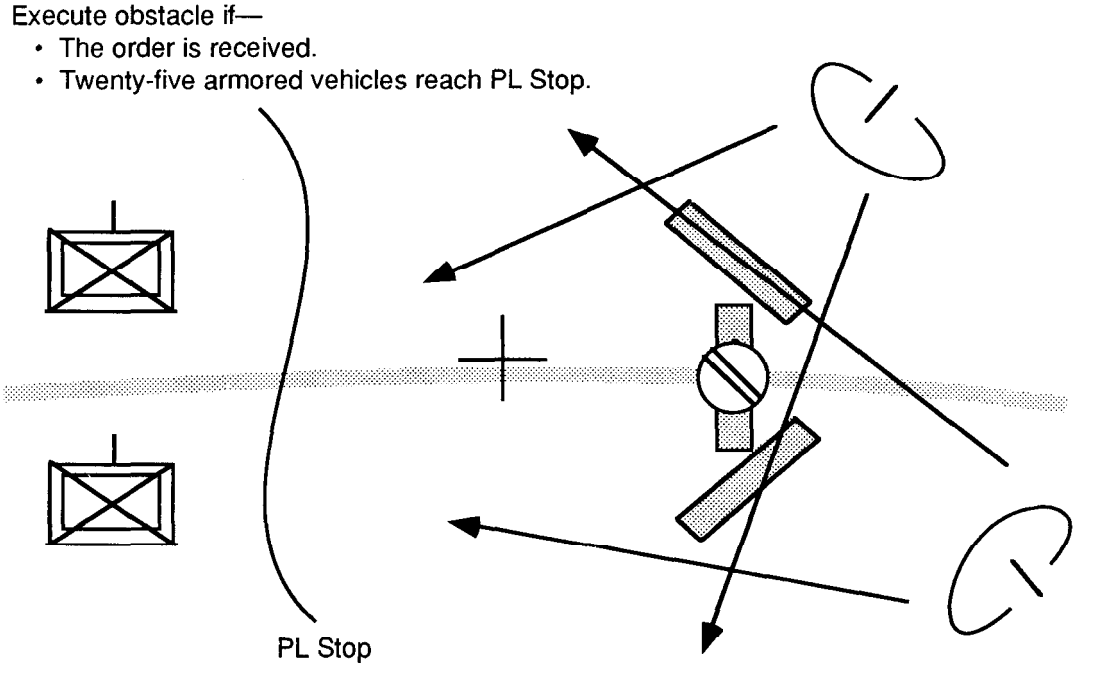


Figure 6-7. Emergency fire-order criteria.

requirements. Units should conduct this rehearsal as part of a larger rehearsal with minimal simulation. The following timing requirements are considered during the rehearsal (see *Figure 6-8):*

- Time required for the guard commander to notify the firing commander to execute the target.
- Time required to execute the target.
- SCATMINE arming and duration time, if applicable.

The guard force and the firing party rehearse notification procedures, using redundant communication procedures, such as wire and radio. They rehearse the time required to receive notification and move to the firing point under all conditions.

The firing commander and the guard commander calculate how long it will take to execute the obstacle. The full rehearsal includes rehearsal of the backup plan and considerations for execution in reduced visibility, such as smoke, darkness, or fog. Once these times are determined through rehearsal, the firing commander informs the guard commander.

Another time consideration is the arming and duration times. If SCATMINEs are used, the arming and duration times can be a significant factor. For example, it takes two minutes for a MOPMS dispensed mine to arm. The duration on MOPMS is sixteen hours (assuming the mines are recycled three times) from the time the mines are armed; however, the mines begin to SD at 80 percent of their expected life. It is important not to execute this and similar systems too late or too early.

During the rehearsal, the guard commander also identifies the decision point for executing the obstacle according to emergency firing orders. Emergency firing orders may not

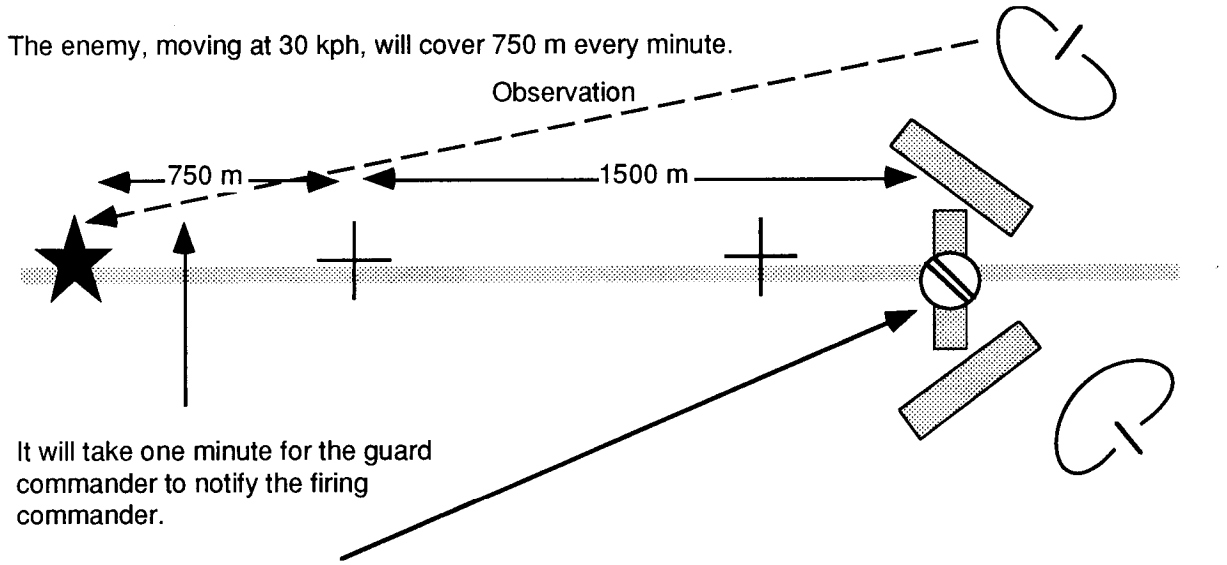


Figure 6-8. Minimum timing requirements for reserve obstacles.

require a physical DP but may require execution of the obstacle based on enemy or friendly actions that the guard commander cannot see. If so, the guard commander confirms, with the authorizing commander, how he will get the information that drives the decision to execute the obstacle (such as a report from the TF scouts that the enemy has reached a certain location).

If execution depends on imminent enemy capture of the obstacle site, the guard commander makes assumptions about how much combat power he must have to retain control of the site. He must also consider the time requirements for execution that will affect the DP. For example, he must determine at what point during the fight to retain control that he can order execution and still have enough time for notification, execution, and arming.

If execution is based on a certain size enemy force reaching the obstacle site, the guard commander uses the time required for obstacle execution and works backwards to locate the DP to execute the obstacle. Ideally, the point should be clearly marked with a TRP. This spot may change based on visibility conditions.

If the reserve obstacle is also a lane, the coordination required is similar to the coordination required to conduct a passage of lines. The guard commander must know the following:

- The number of vehicles to expect.
- The near and far recognition signals.
- The passage time.

Another important element to consider during the rehearsal is the commitment of assets, especially if the assets have other missions. For example, artillery assets must be available to fire a reserve ADAM/RAAM obstacle. During the rehearsal, the staff verifies the availability of the asset and identifies additional situations where the asset may not be available. It ensures that the executing unit understands the commander's priorities.

Chapter 7

Situational Obstacles

This chapter outlines the procedures to determine the requirements for situational obstacles and to plan, prepare, and execute them. Situational obstacles are obstacles that units plan, and possibly prepare, before starting an operation; however, they do not execute them unless specific criteria are met. Unlike directed or reserve obstacles, a situational obstacle may never be executed. Normally, units plan several situational obstacles that rely on the same assets for emplacement. This allows the commander to shift scarce assets to the location where he needs them the most, based on the situation.

EMPLOYMENT PRINCIPLES

Commanders and staffs consider the following basic principles when planning, preparing, and executing situational obstacles:

- Identify the need.
- Plan for appropriate resources.
- Integrate the obstacle with friendly fires.
- Plan the obstacle.
- Identify obstacle execution triggers.
- Withhold execution of the obstacle until it is needed.

IDENTIFY THE NEED

The commander anticipates situations that require him to modify the maneuver and fire plans to defeat the threat, and he considers the use of situational obstacles to support these modifications. He can use situational obstacles as a combat multiplier for branch plans or sequels since they enable him to use economy-of-force measures. The commander can use situational obstacles to—

- Attack an enemy vulnerability.
- Exploit success.
- Separate follow-on enemy forces.
- Provide flank protection.

PLAN FOR RESOURCES

Obstacle emplacement is normally resource intensive. By their very nature, situational obstacles must be able to be installed quickly but still achieve the desired obstacle effect. Units normally use SCATMINEs for situational obstacles, but they may use any type of individual obstacle. Staffs consider that emplacing the obstacle may require multiple assets. For example, using air Volcano requires helicopter transport to emplace the obstacle, soldiers to load the

Volcano mine canisters, and enough canisters to achieve the desired effect on the target.

INTEGRATE WITH FRIENDLY FIRES

Like any obstacle, units integrate situational obstacles into the fire plan. Since obstacle execution depends on development of an expected situation, integrating the obstacles with fires is difficult. Commanders and staffs consider where they can employ situational obstacles and ensure that the combination of fires and obstacles are sufficient to achieve the obstacle effect. Without fires, the obstacle may interfere with the enemy, but he can breach the obstacle at will. For example, using SCATMINEs, without fires, to delay repairs to an enemy airfield will hinder the repairs; however, the enemy can identify and clear the mines without a major risk.

PLAN THE OBSTACLES

Situational obstacles are not used to attack targets of opportunity. Commanders and staffs identify them during the planning process. The time required to commit the asset and integrate the obstacle with fires normally exceeds the window of opportunity against a target. Also, the use of obstacle emplacement assets (such as ADAM/RAAM) against targets of opportunity may waste a valuable obstacle asset that the commander will need later during the battle.

IDENTIFY EXECUTION TRIGGERS

Situational obstacles are triggered based on friendly actions, enemy actions, or a combination of both. For example, the commitment of the friendly reserve may trigger the execution of situational obstacles to separate enemy forces. Another example of a situational obstacle trigger is identification of the enemy attempting to reposition during a DATK. Finally, the commitment of forces along an AA and enemy movement to attack an assailable flank is an example of a combination of friendly and enemy actions that can trigger a situational obstacle (see *Figure 7-1).*

WITHHOLD EXECUTION UNTIL NEEDED

The commander withholds execution of a situational obstacle until the obstacle effect is required. Commanders and staffs consider that the obstacle assets, once committed, are no longer available to support other missions. They also consider that SCATMINEs have a SD time. Emplacing the obstacle too early may result in self-destruction of the mines before the enemy arrives.

SITUATIONAL OBSTACLES IN THE DEFENSE

In the defense, the focus of situational obstacles is to help negate the attacker's initial advantage (see *Figure 7-2, page 7-4).* Some possible uses of situational obstacles in the defense are—

- Reinforce or repair tactical obstacles already emplaced.
- Emplace obstacles where previously there were none.
- Defeat penetrations in the rear area.
- Protect the flanks of CATK forces.
- Separate attacking enemy echelons.
- Reinforce existing (natural or cultural) obstacles on AAs or MCs used by the enemy.
- Shape the battlefield for the deep battle.

SITUATIONAL OBSTACLES IN THE OFFENSE

In the offense, the commander uses the flexibility of situational obstacles to help reduce risk, maintain the initiative, and preserve

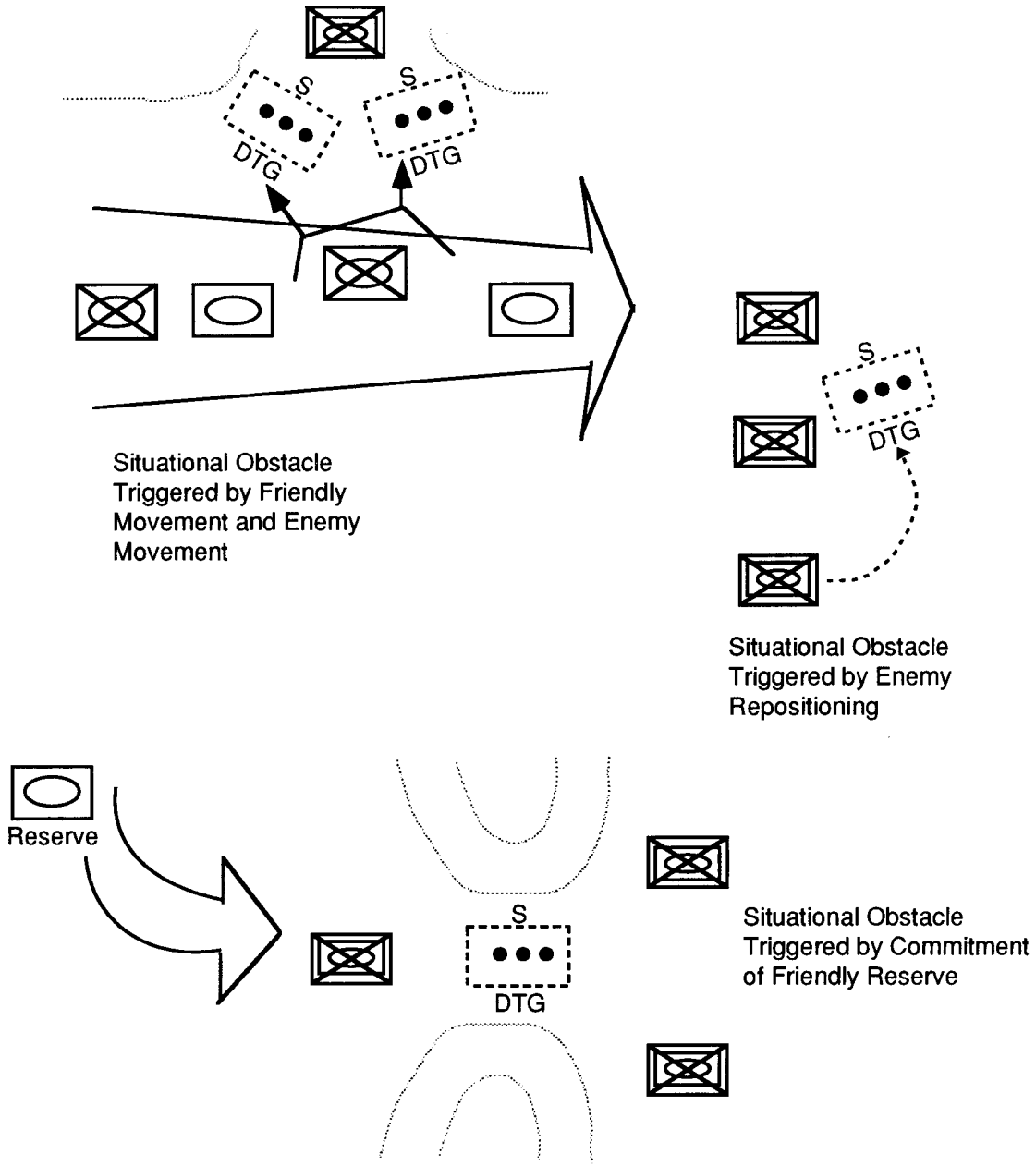


Figure 7-1. Situational obstacle event triggers.

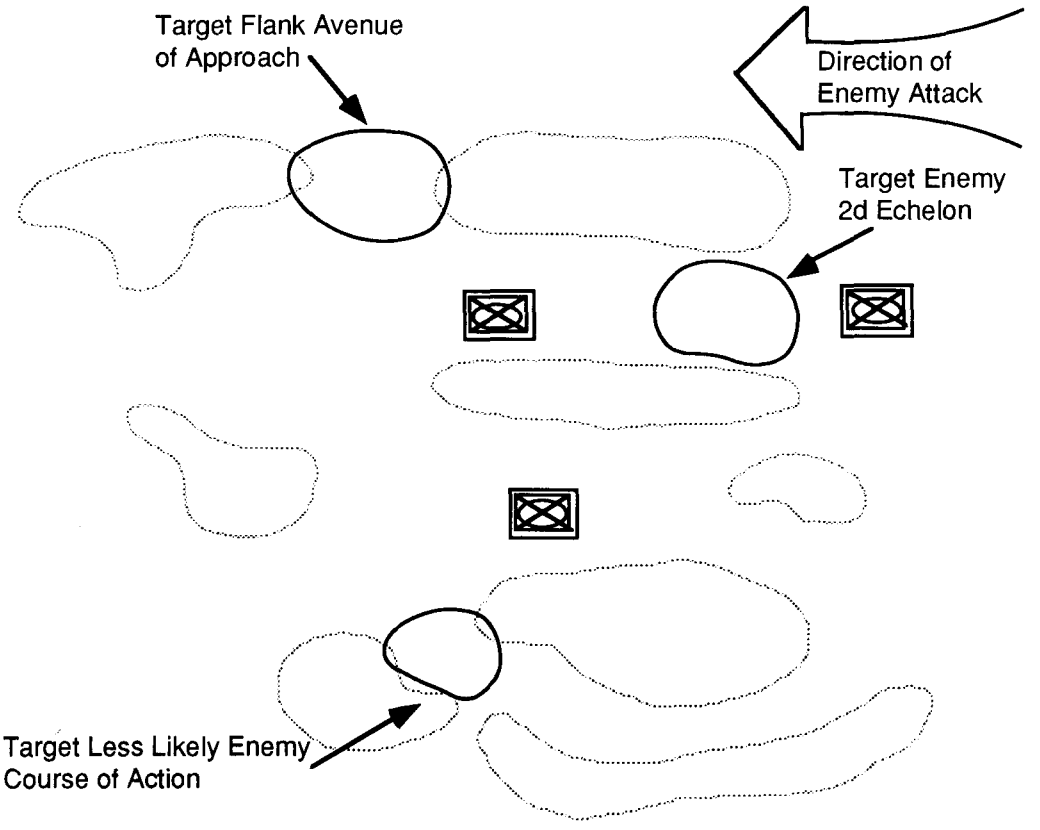


Figure 7-2. Situation obstacles in defense.

freedom of action (see *Figure 7-3).* Some possible uses for situational obstacles in the offense are–

- Interdict commitment of enemy reserves in conjunction with air interdiction (AI), close air support (CAS), or JAATs.
- Assist ground forces (follow and support) in defeating enemy CATKs threatening flanks or penetration.
- Obstruct enemy withdrawal or escape routes in conjunction with enveloping the force.
- Isolate adjacent forces from influencing or reinforcing the main effort.
- Transition to a hasty defense to allow force buildup or passage of fresh forces.

SITUATIONAL OBSTACLE PLANNING

The staff or the commander normally identifies the need for a situational obstacle during analysis of the COAs. However, the staff gathers information or conducts earlier planning which impacts on situational obstacle planning.

MISSION ANALYSIS

The staff gathers facts and develops assumptions during mission analysis. As part of the facts and assumptions, it—

- Determines the unit's capability to collect intelligence.
- Considers the friendly assets that the unit can use to emplace situational obstacles.

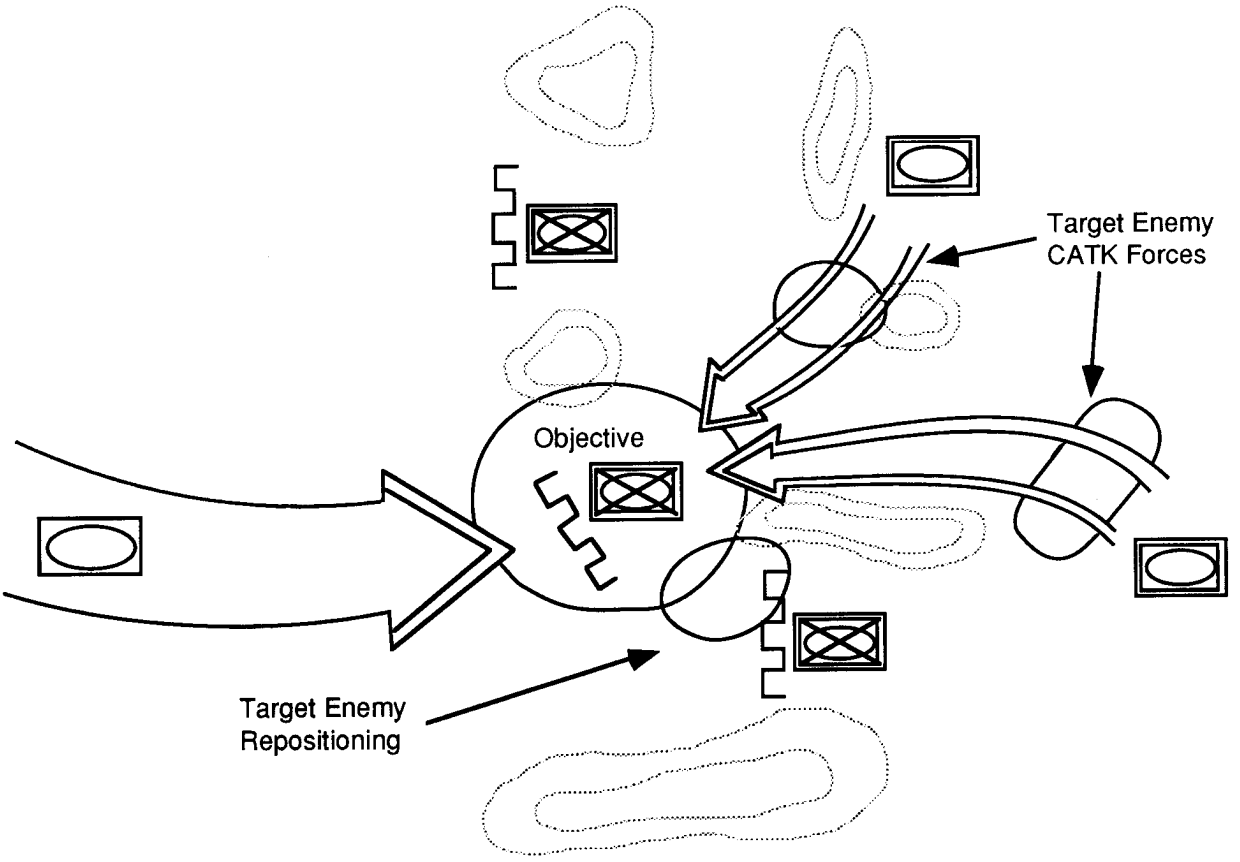


Figure 7-3. Situation obstacles in offense.

- Considers the assets from higher or adjacent HQ that may be available to support intelligence gathering or obstacle emplacement.
- Determines if there are any requirements from higher HQ to plan a situational obstacle.
- Determines if the higher HQ's scheme of maneuver implies the need for a situational obstacle.

COURSE-OF-ACTION DEVELOPMENT

As the staff develops the COA, it may make note of specific actions, or areas, where situational obstacles can support the friendly scheme of maneuver. However, it does the actual obstacle planning in conjunction with the analysis of the COA.

COURSE-OF-ACTION ANALYSIS

The staff uses the event template and decision support template (DST) to assist in situational obstacle planning. The staff develops the event template and DST as part of the analysis of the COAs.

As the staff war-games a COA, it—

- Develops an event template that depicts NAIs which allow the staff to confirm or deny a particular enemy COA based on identification of an enemy activity or lack of enemy activity.

- Uses the event template to identify areas where fires and maneuver can influence the enemy and designates these areas as TAIs on the DST.
- Identifies DPs where the commander must make a decision whether or not to commit fires or forces to attack the enemy at the TAI.

Every TAI will not necessarily require, or be an appropriate location for, a situational obstacle. In some cases, the time that it takes the enemy to travel from an NAI to a TAI will be so short that triggering situational obstacle emplacement based on enemy action may be impossible. If the threat of not having an obstacle in the TAI is great enough, the staff may decide to use a friendly action as the trigger for executing the situational obstacle. The staff focuses situational obstacle planning on those TAIs where obstacles can support friendly fire and maneuver (see *Figure 7-4).*

Fires Analysis

The staff analyzes weapon system ranges and effects to determine locations within TAIs where it can integrate fires and

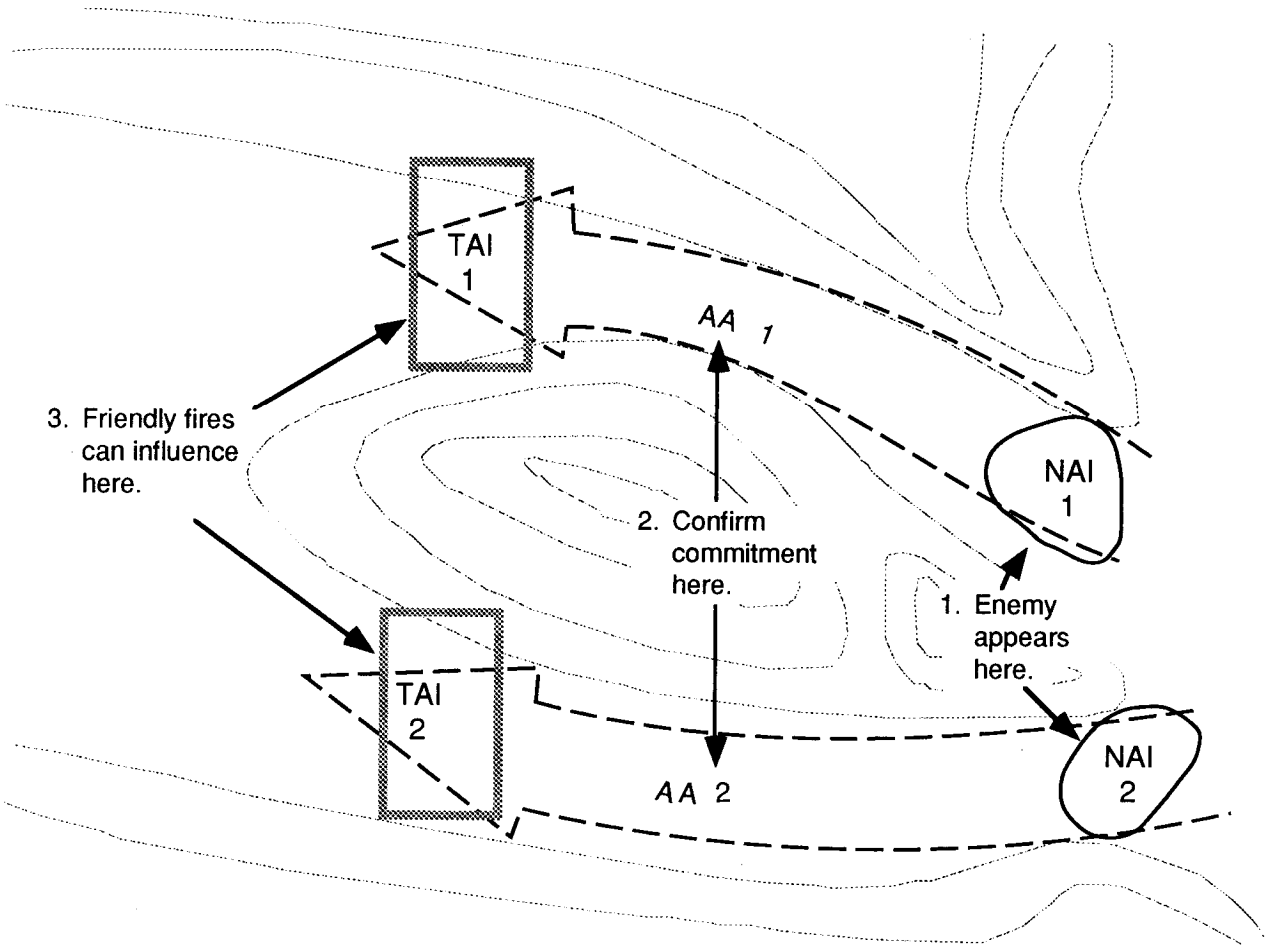


Figure 7-4. Identification of TAIs.

obstacles. The fire supporter, air liaison officer (ALO), and other special staff officers are involved in planning to ensure integration of CAS or JMT missions, if applicable.

Obstacle Intent Integration

After determining where they can use obstacles within TAIs, the commander and staff narrow planning even further by determining the obstacle intent within the TAIs. A TAI is a location where friendly forces can influence the enemy. That enemy is the target of the situational obstacle planned within the TAI. A general location for the obstacle is determined by the TAI and the range and effects of friendly weapons and forces allocated to the TAI. The mission of the friendly force drives the specific obstacle effect and refines the general obstacle location into a location relative to the friendly force or the terrain.

Obstacle Priorities

The commander and staff prioritize the situational obstacles. It is possible that they will develop several "be-prepared" missions for an obstacle emplacement asset. They use the priorities to constrain the situational-obstacle plan based on actual available assets. More importantly, they can use these priorities to assist in decision making during execution of the operation if two or more competing requirements for the same asset develop (see *Figure 7-5, page 7-8).*

Normally, the commander and staff plan for the same obstacle emplacement asset in several TAIs with the expectation that the enemy target will appear in only one. However, the unit controlling the obstacle emplacement capability must understand which obstacle has priority, should the situation call for the same asset in different locations at the same time. The commander and staff must ensure that the element with the obstacle emplacement asset has sufficient time to plan and rehearse each mission.

Mobility Requirements

The commander and staff consider the impact of situational obstacles on friendly mobility. As a minimum, they should consider the impact on the following:

- Overall scheme of maneuver of the higher HQ.
- Branches or sequels in the higher HQ's plan.
- Specified or implied tasks for follow-on forces.
- Branches or sequels in their own plan.

The commander and his staff must ensure synchronization, unity of effort, and support to the overall plan. They must also consider any obstacle-control measures imposed by the higher commander's order. As with any tactical obstacle, situational-obstacle employment is authorized only within the higher commander's obstacle-control measures, unless the subordinate unit obtains approval to put obstacles outside of the control measure.

Obstacle Design and Resourcing

To select the size and type of situational obstacle required to best meet the commander's intent, the staff analyzes the target, the relative location, and the desired effect. It considers the following:

- Size of obstacle required to meet the obstacle intent.
- Location of the obstacle.
- Accuracy of the emplacement asset.
- Trigger for obstacle execution and the DP.
- Time for the enemy to move from the NAI to the TAI.
- Time to commit the obstacle emplacement asset to the TAI.

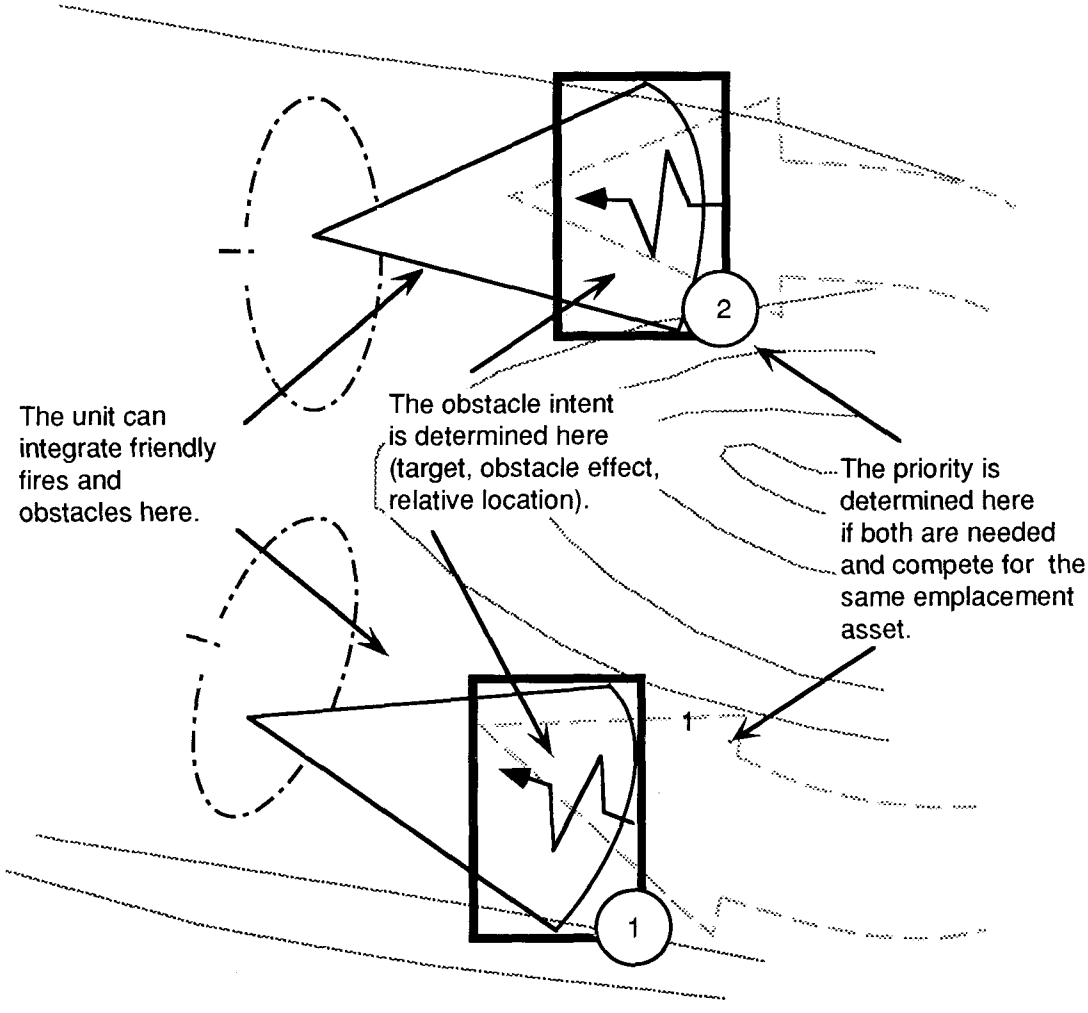


Figure 7-5. Fires analysis, obstacle-intent integration, and obstacle priorities.

- Time for the asset to emplace the obstacle.
- Arming and SD time for SCATMINEs, if applicable.
- Time for allocated fires or force to cover the TAI.
- Availability of the obstacle emplacement asset.
- C2 requirements, to include observation of the NAI and reporting responsibilities.

The staff considers the feasibility of using obstacle assets based on the size and location of the obstacle required and the requirement for accuracy in emplacing the obstacle. For example, locations far forward of friendly positions or behind enemy positions may eliminate the possibility of using conventional obstacles or ground-emplaced SCATMINEs. The large size requirements of an obstacle could eliminate the use of ADAM/RAAM. The accuracy required may also eliminate ADAM/RAAM or Gator from consideration.

The trigger and time considerations reflect the necessity of having the obstacle emplaced and armed before the enemy

arrives at the TAI. The commander must be able to—

- Decide to emplace the obstacle.
- Move the asset to the TAI.
- Emplace the obstacle, to include ensuring that it is armed and has not reached its SD time.
- Ensure that the TAI is covered by friendly fires before the enemy arrives.

The staff must select an obstacle design and emplacement asset that can meet the time requirements.

The availability of an emplacement asset is a major consideration. The staff identifies other mission requirements that may compete for the same asset. For example, the artillery may not be able to fire ADAM/RAAM at the expected point in the battle because of other mission requirements.

The staff also determines who will observe the event that triggers the situational-obstacle execution. The unit must clearly identify the observer and a backup observer. If situational obstacles are tasked to subordinate units, they must have the observation platform to identify the target. The unit must also identify clear and concise execution criteria and ensure that communication links are understood. Control procedures should be clearly established. For example, if the higher commander retains the obstacle at his level, the C2 needed to gain approval at a later time should be clearly defined.

The staff relies on the expertise of special staff officers, depending on the assets needed, to emplace the obstacle. The engineer may work closely with the ALO or air mission commander in planning the delivery of air Volcano mines in the right configuration to achieve the desired effect. When planning ADAM/RAAM use, the FSO and FSCOORD are involved to ensure that the batteries are in position at the right place and time with the right mix of ammunition to emplace the minefield.

DECISION AND EXECUTION

The staff provides subordinate units with information on the situational obstacle plan in the scheme of obstacles overlay and the situational obstacle execution matrix. Subunit instructions or the operational execution matrix refer appropriate subunits to the situational obstacle matrix.

Scheme-of-Obstacles Overlay

As with reserve obstacles, the staff uses the obstacle effect graphic and the specific individual obstacle symbols (because the commander normally intends to use a specific type of individual obstacle). This ensures that the force attacking the enemy in the TAI and the unit emplacing the obstacle understand the intent of the obstacle.

Situational-Obstacle-Execution Matrix

The situational-obstacle-execution matrix is similar to other obstacle-execution matrixes (see *Figure 7-6, page 7-10).* Information normally shown on the matrix includes—

- Zone/belt/group designation and individual obstacle numbers.
- Location (to include TAI designation and exact grid coordinates), effect, and priority.
- Emplacing and owning unit.
- Trigger for the obstacle.
- NAI/DP for the obstacle.
- Emplacing asset and its source.
- Unit responsible for observing and reporting on the NAVDP.
- Any special instructions for each group.

Rehearsals

Once the order is published, the next step is to rehearse the execution of the obstacle. The focus of the rehearsal is to confirm the timing requirements and ensure that all persons involved in the

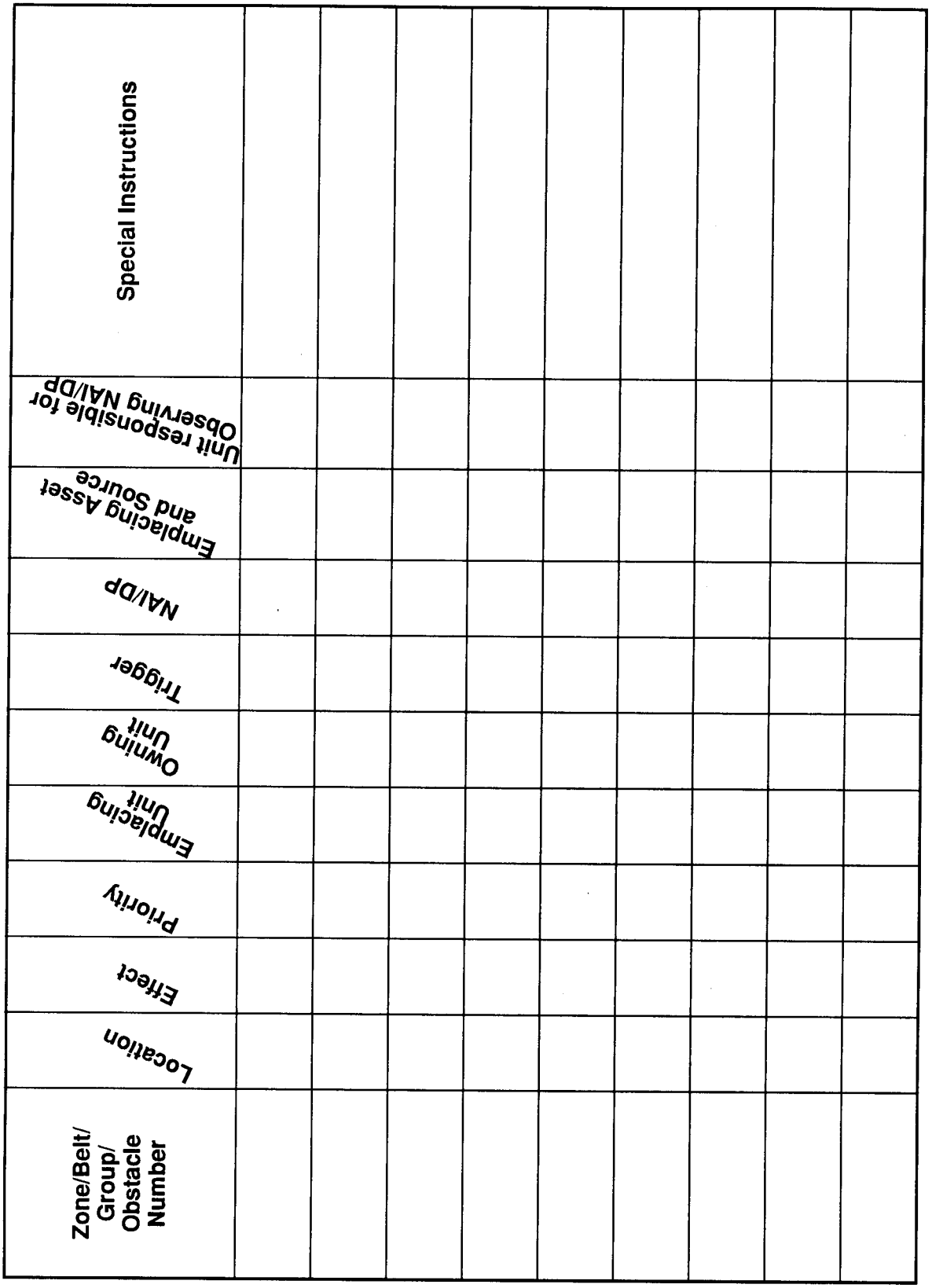


Figure 7-6. Situational-obstacles-execution matrix.

obstacle execution understand their responsibilities. The situational-obstacle rehearsal normally is conducted as part of a larger rehearsal, although each situational obstacle is covered.

There may be several different rehearsals at several different levels, For example, a TF and an artillery battalion rehearsal might include the same ADAM/RAAM target. An air Volcano minefield might be covered during a brigade rehearsal and the aviation unit rehearsal.

The intent of the rehearsal is to synchronize the execution of the obstacle. The unit verifies and refines the timing requirements considered during obstacle design (see *Figure 7-7).* First, if the trigger includes an enemy action, the unit determines the time required for the enemy to move from the NAI to the TAI. If possible, it does this by actually moving subunits from the NAI to the TAI at a doctrinal enemy movement rate. It modifies the movement rate based on expected weather and light conditions. The unit may need to adjust the location of the observation platform that is observing the NAI, based on the terrain or expected weather or light conditions. The location of the NAI or DP may require marking with a TRP.

Next, the unit verifies how long it will take to commit the obstacle asset to the target location. This includes the time required to—

- Report the trigger (enemy arrival at the NAI or friendly action that serves as the trigger).
- Decide to execute.
- Order the execution.

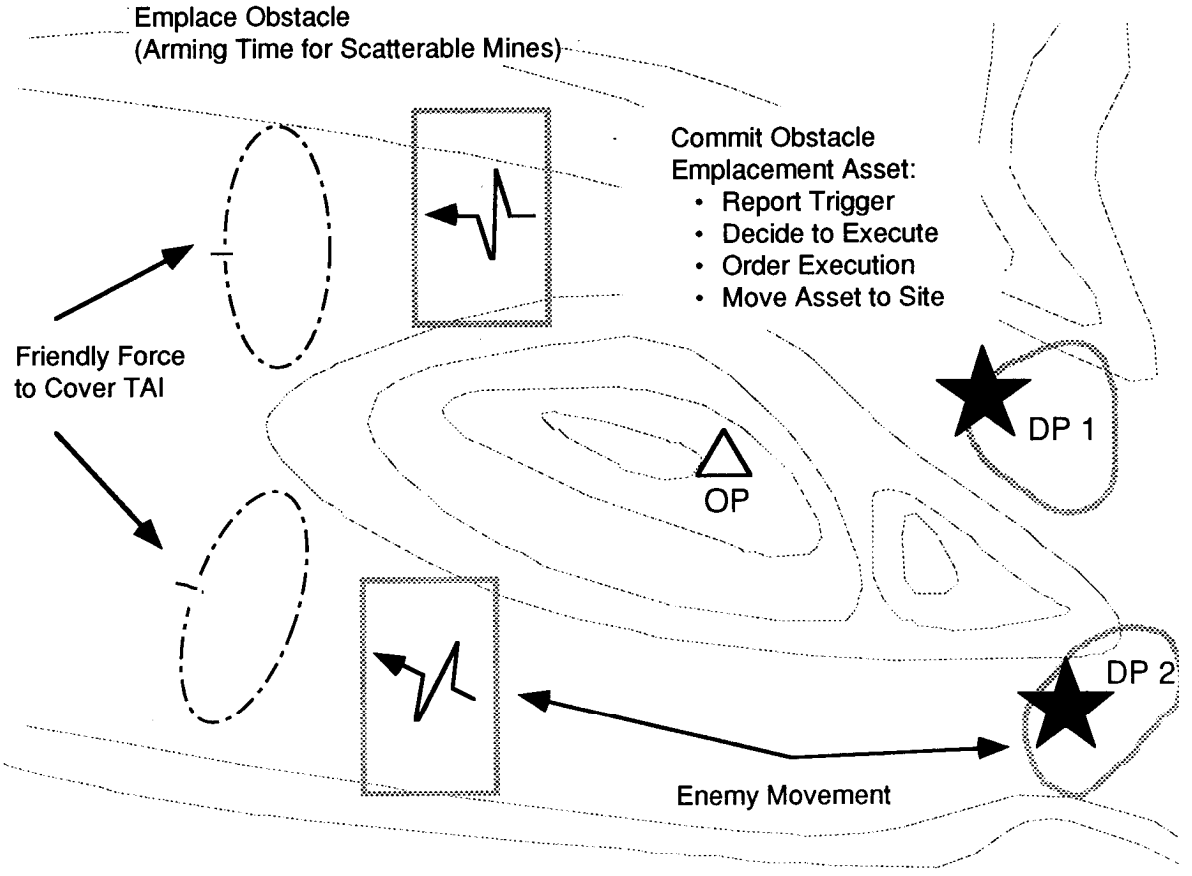


Figure 7-7. Time requirements.

- Move the emplacing asset to a location where it can begin emplacing.

The unit confirms the emplacement time of the obstacle. This may be determined by an actual physical rehearsal (such as how long it will take a ground Volcano system to drive the obstacle trace or a similar piece of terrain). The unit may need to estimate the emplacement time, based on previous experience or training, such as in the case of artillery-delivered ADAM/RAAM.

If the unit uses SCATMINEs for the situational obstacle, it figures arming time into the total time required for emplacement. For example, it takes 45 minutes for a Flipper mine to arm. Another time factor the unit considers is the duration of the effect. The SD time for short duration ADAM/RAAM, for instance, is four hours from the time the mine is armed (the first mines will begin to SD after 3.2 hours). Consequently, it is important that the obstacle is not executed too early.

Once the unit verifies the total time required for the situational-obstacle execution, it compares this time with the time required for enemy movement from the NAI to the TAI. If the time to execute exceeds the enemy movement time, the unit may need to modify the emplacement plan. The unit may change the design of the obstacle, such as reducing the density of a scatterable minefield to reduce emplacement time. The unit may change the DP location by accepting risk and putting the DP farther out than the NAI and deciding to execute based on a probable rather than a confirmed enemy action. The unit also can change emplacement asset numbers or locations, such as increasing the number of firing batteries for ADAM/RAAM or positioning emplacing systems closer to the obstacle location.

The unit also compares the emplacement time with the time required to integrate fires and maneuver with the obstacle. The unit ensures that the time requirements allow it to synchronize the effects of the obstacle with fires on the enemy at the TAI.

Another important element to consider during the rehearsal is the availability of assets. The staff must ensure that the assets necessary to emplace the situational obstacle are available for the mission. During the rehearsal, it is very important to determine the availability of the asset and potential situations where the asset may not be available. The priorities for all emplacing assets must be very clear.

Execution

Situational obstacles provide a tremendous capability to the unit. The success of situational obstacles depends on a good plan, rehearsed preparation, and disciplined execution.

Chapter 8

Protective Obstacles

Protective obstacles are obstacles that commanders use to protect soldiers, equipment, supplies, and facilities from enemy attacks or other threats. These other threats range from enemy surveillance to the theft of supplies and equipment by noncombatants. In tactical operations, protective obstacles provide friendly forces with close-in protection and help finish the enemy's complete destruction. However, in OOTW, protective obstacles may focus primarily on preventing unauthorized access to facilities and installations by civilians, rather than assisting in the destruction of an enemy force.

TYPES OF PROTECTIVE OBSTACLES

There are two types of protective obstacles. They are—

- Hasty protective obstacles.
- Deliberate protective obstacles.

HASTY PROTECTIVE OBSTACLES

These protective obstacles are temporary in nature. They are obstacles that soldiers can rapidly emplace and recover or destroy. Platoons and company teams employ hasty protective obstacles next to their positions to protect the defending force from the enemy's final assault. Base cluster and installation commanders may emplace hasty protective obstacles to protect against all levels of threat when they occupy sites temporarily or until they can plan and emplace deliberate protective obstacles.

DELIBERATE PROTECTIVE OBSTACLES

These are protective obstacles that are more permanent and require more detailed planning and usually a greater expenditure of resources. Units employ deliberate protective obstacles in strongpoints or at relatively fixed sites. During tactical operations, company teams and platoons may emplace deliberate protective obstacles if they have considerable time available. For example, forces that conduct early entry operations before the onset of hostilities may have time to construct deliberate protective obstacles. During OOTW, units emplace deliberate protective obstacles as part of their force protection plan.

EMPLOYMENT GUIDELINES

There are basic guidelines that apply to protective obstacles, some of which apply to

tactical obstacles as well. These guidelines are—

- Obstacles do not stand alone.
- The owning unit is normally the emplacing unit.
- Emplacement authority is not tied to obstacle-control measures.
- Planning occurs at the company-team and base commander level.
- Planning includes resourcing that is separate from tactical obstacles.
- Obstacles are reported, recorded, and tracked.

INTEGRATING

Protective obstacles do not provide protection by themselves. In tactical operations, leaders integrate protective obstacles with direct and indirect fires and observation. As with tactical obstacles, integration with friendly fires is critical if the obstacle is to be effective and destroy the enemy force.

In OOTW, integrating fires and destroying an enemy force may not be considered if the obstacles are to prevent noncombatants from accessing a facility or installation; however, the obstacles must remain under constant observation. Leaders must also allocate sufficient force to protect the integrity of the obstacle, consistent with the rules of engagement for the operation.

EMPLACING UNIT

The unit that occupies a position generally emplaces its own protective obstacles. Engineers provide technical expertise and equipment, as required. Commanders focus engineer effort on tactical obstacles, but engineers may be responsible for installing protective obstacles, especially for large installations or compounds or in support of a strongpoint.

EMPLACING AUTHORITY

Unlike tactical obstacles, the emplacement authority for protective obstacles is not normally tied to obstacle-control measures. Higher commanders authorize subordinates to emplace protective obstacles outside of obstacle zones, belts, or groups with minimal restrictions. Commanders may specify in SOPs that subordinates can emplace protective obstacles except as restricted in subsequent OPORDs.

PLANNING LEVEL

Planning occurs at the company team and base-cluster commander level. Company team commanders plan protective obstacles to support their defensive positions. The lack of a staff and limited time usually require that the company team commander plan only hasty protective obstacles. Base cluster and installation commanders conduct detailed planning for deliberate protective obstacles around their sites.

RESOURCING

Units plan resourcing separately for protective and tactical obstacles. They plan for sufficient Class IV and Class V obstacle material to emplace the protective obstacles. They may transport and collocate these materials with those for tactical obstacles; however, the material allocation to subordinate units is planned separately from tactical obstacles. Also, most units carry a basic load of Class IV and Class V materials specifically for protective obstacles. This basic load is only enough for rudimentary hasty protective obstacles. Staffs from corps to TF level plan to push obstacle material to subordinate units so that the materials are available early during preparation of a defense.

REPORTING, RECORDING, AND TRACKING

Units report, record, and track protective obstacles as described in *Appendix B.* Unlike tactical obstacles, owning units recover protective obstacles, or transfers them to a relieving unit, before leaving an area. Sometimes, units may be forced to abandon protective obstacles. Units report any of these events on a case-by-case basis.

PROTECTIVE-OBSTACLE PLANNING

Units develop protective-obstacle plans as part of the decision-making process. They make detailed plans for protective obstacles after they have decided on a COA. At company team level, for example, this includes selection of the location and orientation of platoon positions. For base cluster or installation commanders, this might include selecting base locations or fixed installation sites. (For clarity, all subunit positions, locations, or sites are referred to as positions for the remainder of this chapter.) The following paragraphs contain a technique for planning protective obstacles.

MISSION ANALYSIS

Units determine their authority to emplace protective obstacles from the higher HQ's OPORD. Units also determine if the higher HQ has placed any restrictions on the types or locations of protective obstacles or if the higher HQ's scheme of maneuver implies the need for restrictions on protective obstacles.

Units at every level conduct continuous IPB activities during planning. Following selection of a COA, units conduct detailed terrain analysis of the area adjacent to planned or actual subunit locations. They also analyze the threat to subunits. They figure out threat capabilities, vulnerabilities, and potential COAs, focusing on the enemy's close assault, if applicable. The analysis of the terrain and enemy is very detailed because it focuses only on the area and threat around subunit locations.

During protective-obstacle planning, units evaluate the area around their positions out to about 500 meters (METT-T dependent). Although they can conduct an initial evaluation by map, the unit must conduct physical reconnaissance of the area. They incorporate threat considerations during this evaluation. Some considerations are—

- The likelihood of an assault against the position.
- The type of enemy forces that can, and are most likely to, operate in the area.
- Mounted and dismounted AAs into or within the position.
- Templated methods and weapon systems the enemy can employ for close assault.
- Dead space and natural lines of drift for an attacker.
- Possible assault positions or other positions favoring the templated attacker.

Protective-Obstacle Bands

To evaluate the area close to a position for protective obstacles, it is useful to segment the area into bands. *Figure* 8-1, *page 8-4,* shows a sample area divided into four bands. METT-T drives the number and dimensions of each band.

Band One. This band is farthest from the position, normally 300 to 500 meters away. Primary threat considerations are heavy weapons, such as tank or infantry fighting vehicle (IFV) main guns, heavy or medium hand-held AT weapons, and heavy machine guns. Another consideration is the location of possible enemy assault positions.

Band Two. This band is from beyond 30 meters to 300 meters away. Primary threat considerations are small arms; light, hand-held AT weapons; grenade

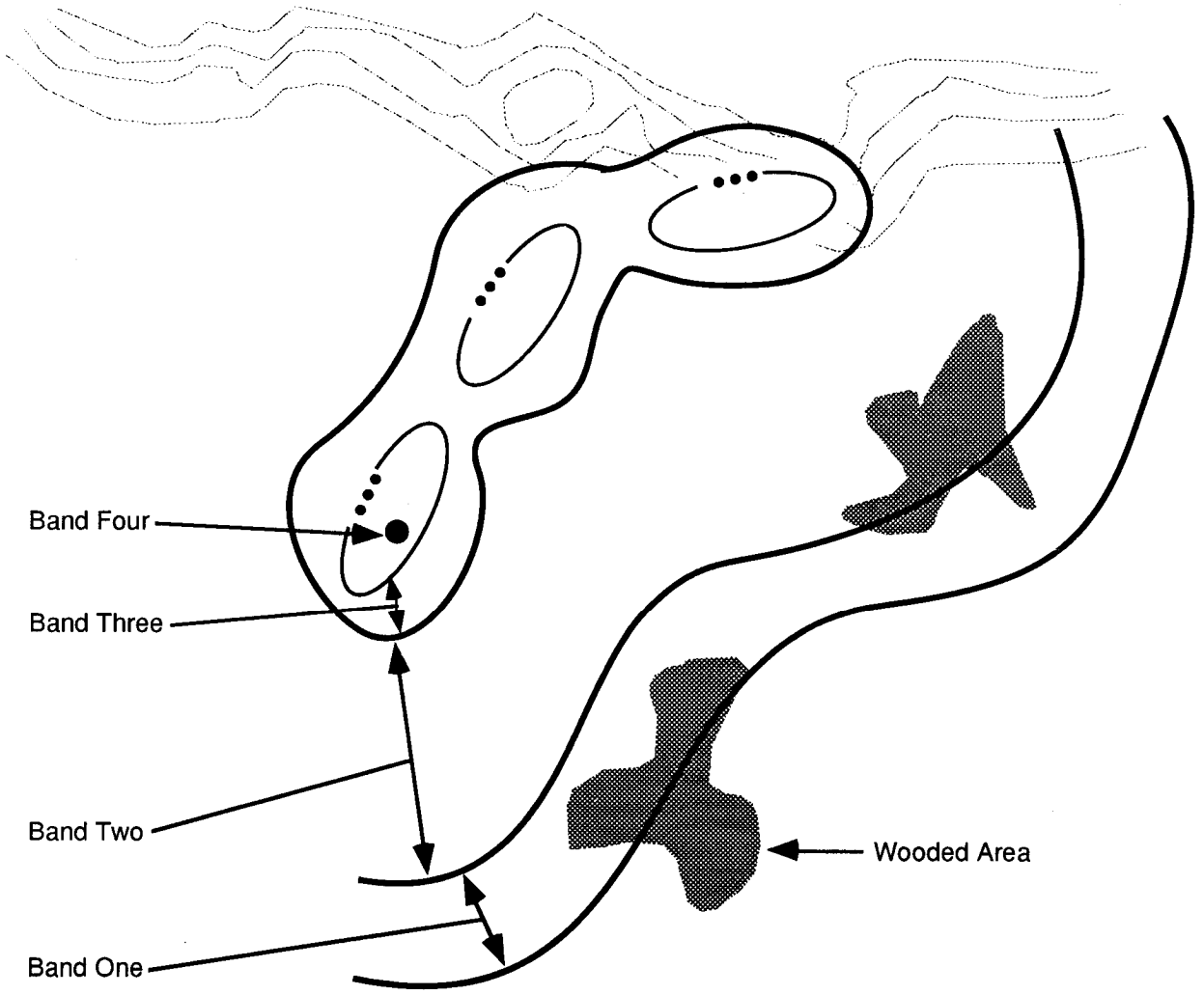


Figure 8-1. Protective obstacle bands.

launchers; and possible assault positions for dismounted infiltrating forces. Other considerations include moving vehicle bombs or moving vehicle assaults.

Band Three. This band lays between Band Two and the unit and defines the perimeter of the unit position. It extends from the individual equipment or personnel protective positions out to 30 meters. The primary threat considerations are hand-thrown grenades or other explosive charges and small-arms fire.

Band Four. Band Four is the area within the position, and its size depends on the size of the position. The primary threat is an enemy force that has entered the position.

Protective-Obstacle Capabilities

Units must analyze their vulnerabilities and capabilities. Some of the considerations for this analysis include—

- Type, quantity, and importance (to the current or future mission) of friendly subunits and systems.
- Capability of subunits to construct protective obstacles (based on manpower, equipment, materials, or other resources).

- Vulnerability of subunits to the templated enemy's assault.
- Level of protective obstacle effort required for each subunit and system.

COURSE-OF-ACTION DEVELOPMENT

As units develop a COA, they may make note of areas, or subunits, where protective obstacles may be needed; however, they do the actual obstacle planning after deciding on a COA.

COURSE-OF-ACTION ANALYSIS

As units analyze COAs, they may make note of additional requirements for protective obstacles. They may identify likely areas during war gaming.

DECISION AND EXECUTION

After selecting a COA, the unit refines it. Part of that refinement is planning protective obstacles, focusing on the following:

- Fires and observation.
- Obstacle integration.
- Obstacle priorities.
- Mobility requirements.
- Obstacle design and resourcing.
- Obstacle overlay.

FIRES AND OBSERVATION

Units analyze the areas within each band to determine the locations where they can integrate obstacles with fires and observation against an assaulting enemy. Units consider not only direct-fire weapon systems but also indirect-fire systems and the use of command-detonated mines. Units also consider all methods available for maintaining observation, to include remote sensors. Especially in OOTW, this analysis may show that OP locations must change to ensure constant observation of the obstacles. Identification of locations where they can integrate fires, observation, and obstacles helps units to focus planning for obstacles. The units can sketch these areas on an overlay to aid in further planning.

OBSTACLE INTEGRATION

Based on the identification of the locations where obstacles can be integrated with fires and observation, the unit can sketch in a trace of proposed obstacles in each location. These traces represent where the unit may emplace obstacles in each band, without specifying the types or actual location of individual obstacles.

OBSTACLE PRIORITIES

The unit assigns a priority for obstacles by band and annotates this on the planning overlay. It considers the vulnerability of subunits and systems based on the type of enemy expected. For example, a light infantry company team expecting an assault by a mounted enemy force would probably give first priority to protective obstacles in Band Two to help defeat a mounted assault. A unit involved in peacekeeping operations in a position where the primary threat is a semihostile group of unarmed civilians would set a different priority. It would likely choose to construct obstacles in Band Three first to prevent the civilians from making physical contact with the unit. *Figure 8-2, page 8-6,* shows an example of an overlay annotated with the fires and observation analysis, obstacle integration, and obstacle priorities.

MOBILITY REQUIREMENTS

The unit identifies mobility requirements. These requirements generally dictate that

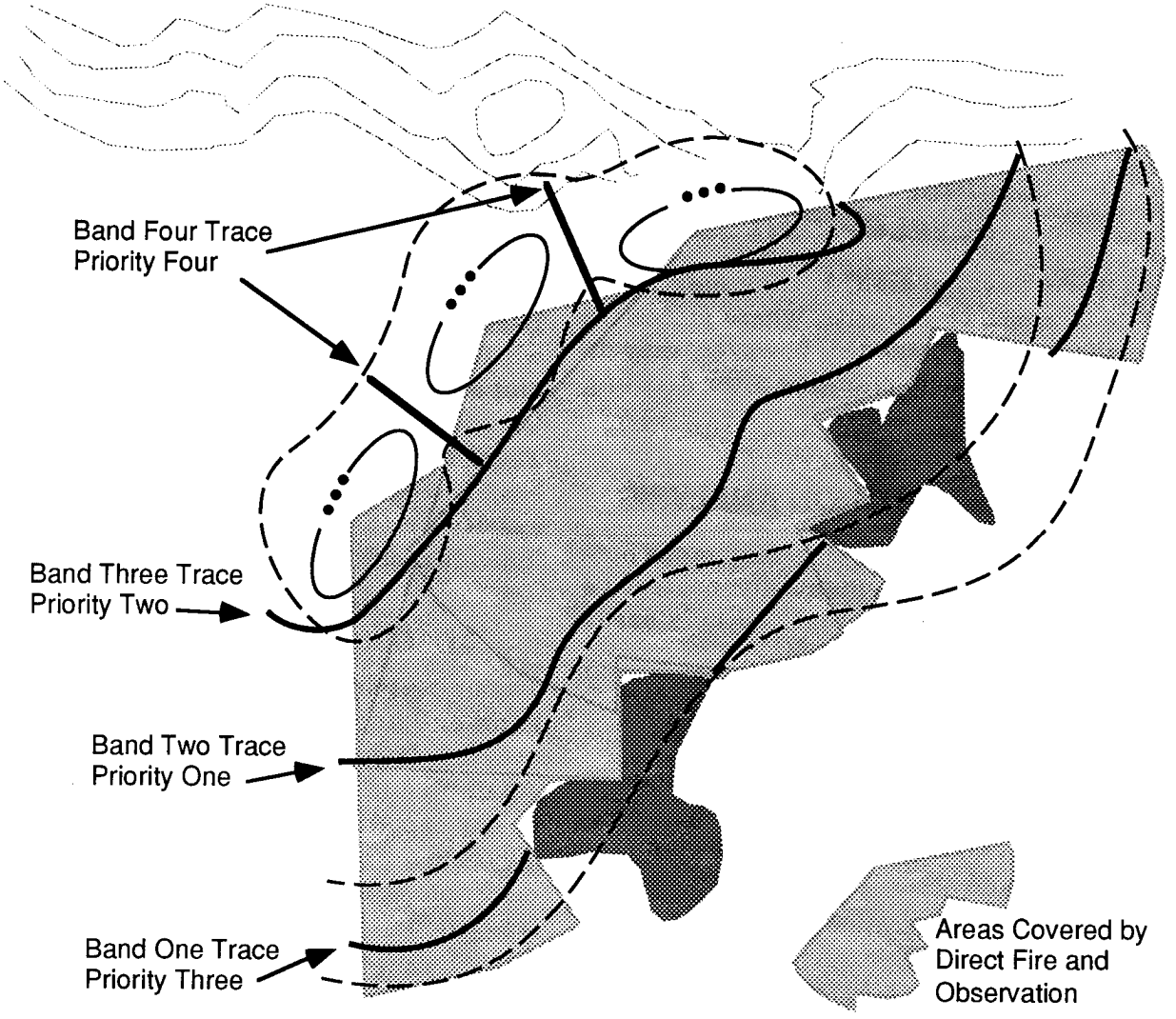


Figure 8-2. Fires and observation and obstacle integration and priorities.

the unit leave lanes or gaps in obstacles. It uses these lanes or gaps to allow—

- Patrols to enter and leave the position.
- CATK/reaction forces to move through the position.
- Logistic and support traffic to enter and leave the position.

METT-T will determine if these areas remain open (closed on-order) or closed with the defender able to open the lane. Units change lane and gap locations periodically to keep the enemy from finding them. They plan and rehearse lane closure. Lanes and gaps are weak points in protective obstacles, so units consider allocating increased direct and indirect fires to cover them.

It is easy to establish lanes or gaps and subsequently close them in restrictive terrain. It is more difficult to establish and then close lanes or gaps on roads or vehicle approaches into a position. Normally, the location of lanes on vehicle routes are fixed, complicating the defender's ability to change

their location. When METT-T permits, units plan multiple vehicle lanes. Units then alternate the lanes that are open at any time. With the alternating opening and closing of these lanes, units can also change the method and material used to close the lane.

When units can establish only one lane, they develop redundant methods for closing the lane. Other obstacles can be built parallel to the lane to contain any vehicles that penetrate at the lane. *Figure 8-3* shows the identified mobility requirements annotated on the planning overlay.

OBSTACLE DESIGN AND RESOURCING

Units design and resource protective obstacles within each band to accomplish the following:

- Counter the templated threat.
- Enhance direct and indirect fires and observation.
- Support the commander's force protection plan.

Ideally, units construct obstacles in all four bands and tie the obstacles together to

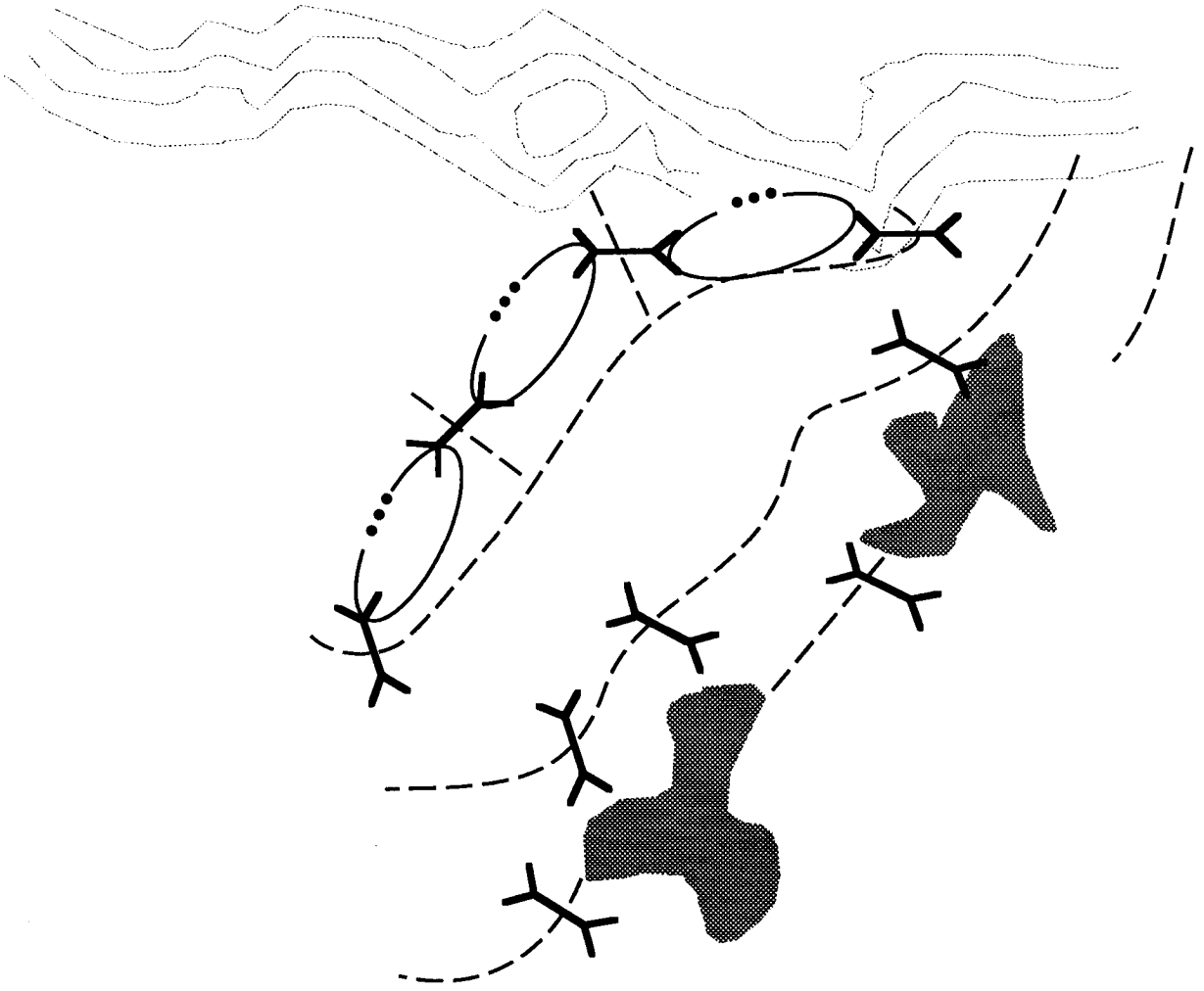


Figure 8-3. Mobility requirements.

ensure that there are no bypasses; realistically, this is usually not possible.

Band One

Protective obstacles in Band One deny the enemy a position from which it can support assaulting forces by fire. Units design protective obstacles to defeat the expected enemy. If the unit is a light infantry company team, the greatest threat in Band One may be tank and IFV main gun fire. Therefore, the unit designs obstacles that can help defeat this threat, such as AT minefield in potential attack-by-fire positions. If the unit is a tank company team, the greatest threat in Band One may be dismounted infantry that are armed with medium AT weapons. The unit may design obstacles that include AP mines and wire to defeat this threat.

Tactical obstacles frequently tie into protective obstacles in this band. *Figure 8-4* shows an example of a turn obstacle group into which the unit ties protective obstacles. The protective obstacles at this point also

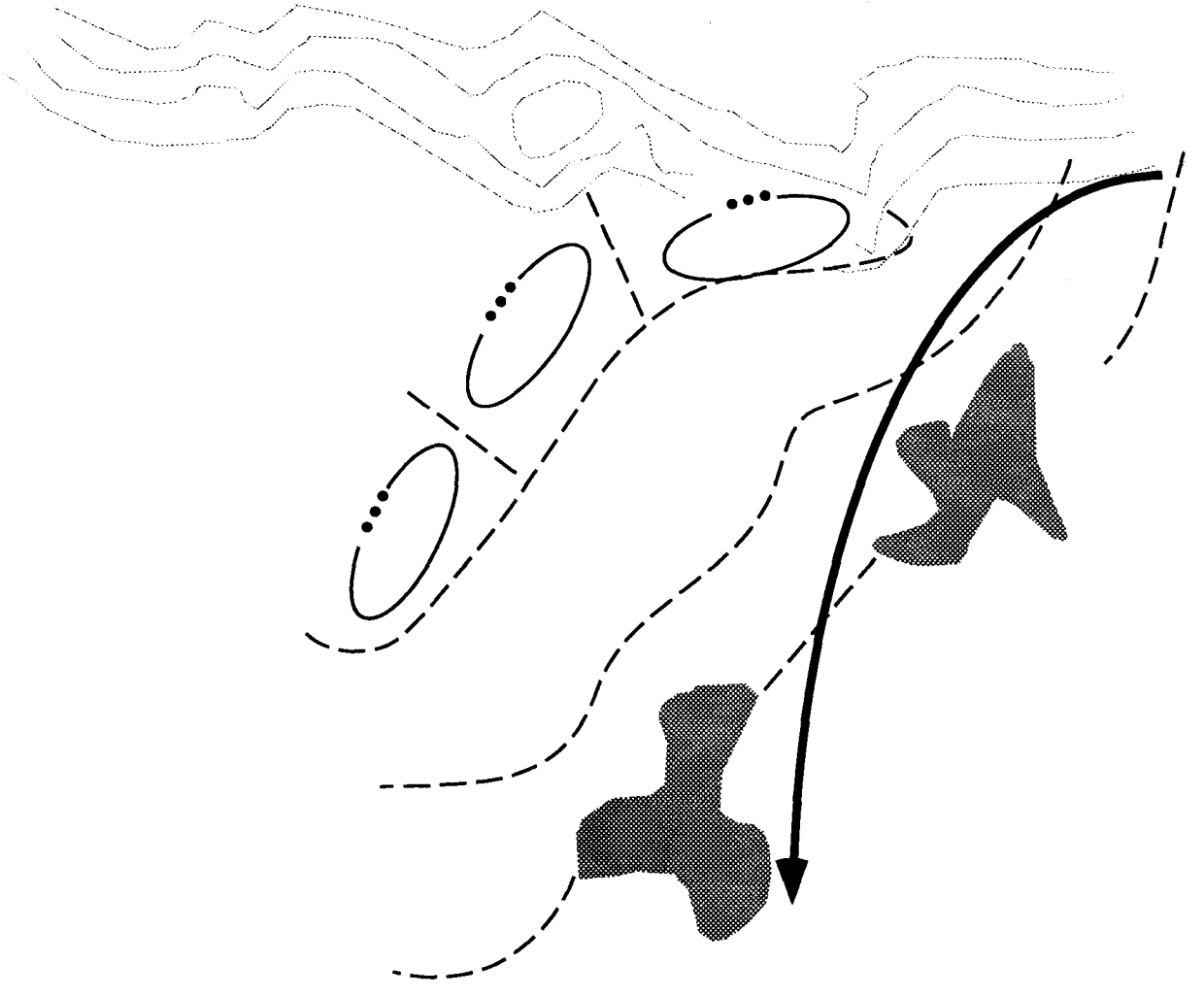


Figure 8-4. Band One and the tactical obstacle link.

strengthen the anchor point of the turn obstacle group. This helps the defender to stop a mounted enemy from rapidly dismounting to breach or conduct an assault of the position.

Band Two

Band Two's focus is to break up enemy assault formations and to deny any attack-by-fire positions for the enemy's small arms or light AT weapons. Like Band One, Band Two obstacles may be tied into tactical obstacles. This commonly occurs in restrictive terrain where the direct-fire EAs are usually small and the direct-fire engagements are close. Another example is the protective obstacles around a block obstacle group. In this instance, the company team commander ensures that the tactical and protective obstacles support each other.

In Band Two, dismounted units use AT minefield to help defeat mounted assaults in tactical situations. In all situations, they may use wire road blocks or other constructed antivehicular obstacles to defeat moving-vehicle threats, such as terrorist vehicle bombs. Dismounted units may also incorporate AP minefield and wire obstacles to help break up enemy dismounted formations. Mounted units generally design Band Two obstacles to defeat enemy dismounted infiltration forces and, as in Band One, to deny positions for dismounted forces with light AT weapons.

Band Three

Protective-obstacle considerations within Band Three focus on defeating dismounted threats. Both mounted and dismounted units use wire obstacles and possibly directional and command-detonated AP mines. These obstacles help to prevent enemy forces and other threats from entering the unit's position.

Band Four

Protective obstacles in Band Four help to break up the actual unit position and prevent the enemy from moving within the position. Units can do this by putting protective obstacles throughout the position, segmenting it into irregular pieces. This causes the attacker to breach repeatedly once he is on the position, enhancing the defender's ability to CATK, to maximize defensive fires, to provide time to reorganize, or to conduct retrograde operations. Obstacles in Band Four usually are wire or other constructed AP and AT obstacles. Units normally do not use mines within their position because of the fratricide risk. *Figure 8-5, page 8-10,* shows an example of a protective obstacle array around a company team.

Sources for Materials

Units emplacing protective obstacles rely on three sources for protective obstacle materials. They are—

- Unit basic load.
- Push packages.
- Requisitioned material.

Unit Basic Load. This source provides units with a very limited capability for hasty protective obstacles.

Push Packages. A more important source for hasty protective-obstacle materials is push packages based on subunit capabilities. A technique is to develop packages, based on subunit types, as part of unit SOPs and to push those packages down to the subunits as soon as it is apparent that the unit will require protective obstacles.

Requisitioned Material. Materials to support deliberate protective obstacles are usually requisitioned based on actual requirements to complete the protective obstacles that the unit plans.

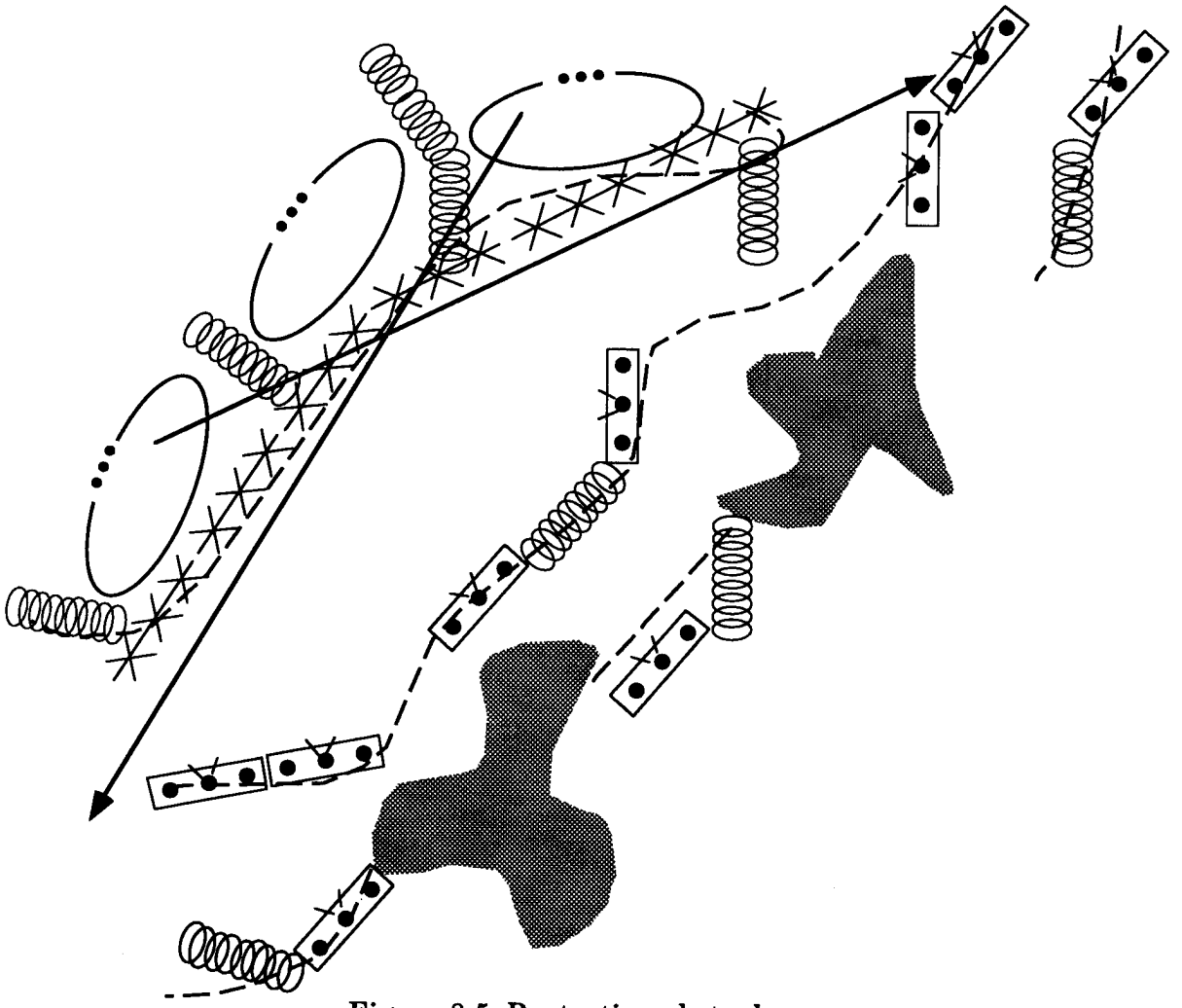


Figure 8-5. Protective obstacle array.

Other Design Considerations

Some additional considerations for protective obstacle designs are as follows:

- Employment in depth.
- Obstacle protection.

Employment in Depth. Protective obstacles do not seriously inhibit the enemy's assault until they overload or exhaust his breaching capabilities. This requires obstacles employed in depth. It is difficult to construct a continuous array of protective obstacles from Band One through Band Four; however, units can construct successive bands of obstacles, with each focused at a specific threat. This requires the enemy to continually deploy and regroup in an area of intensive fires until friendly forces can destroy the enemy or force its withdrawal.

Obstacle Protection. Obstacle camouflage depends on obstacle siting. Large protective obstacle systems are not easy to conceal by siting alone. However, when units take advantage of the terrain and locate protective obstacles in folds of the terrain, around blind curves in high speed AAs, or on the

reverse slope of a hill, they are less visible to an attacker. To aid in the camouflage of protective obstacles from aerial observation, units avoid regular geometric layouts of protective-obstacle systems. Camouflage and deception can be enhanced with phony obstacles used to confuse the attacker as to the exact location and extent of the protective-obstacle system.

Continuous physical reconnaissance of protective obstacles is extremely critical. Units must keep protective obstacles under continuous observation at all times. In those areas where dead space exists, units use other means of early warning and monitoring, such as flares, remote sensors, and GSRs. These measures ensure that an infiltrating force cannot enter the area undetected.

PROTECTIVE-OBSTACLE OVERLAY

Units execute protective obstacles as they prepare their defensive positions. Normally, the unit commander distributes an overlay to his subordinates that depicts the type and location of each protective obstacle. The commander allows subordinates the flexibility to make minor changes to his plan.

As units complete the obstacles, they report and record the obstacles according to the procedures in *Appendix B* and guidance from their higher HQ. Throughout the operation, units maintain positive control over their protective obstacles to protect them from compromise by enemy forces. More importantly, they assist other friendly units from straying into the protective obstacles, thus preventing fratricide.

Appendix A

Individual Obstacles

This appendix contains a description of the different types of individual obstacles. Also, there is a discussion of individual obstacle designs and how to develop individual obstacles. Lastly, this appendix describes the array of individual obstacles to support the obstacle effects.

INDIVIDUAL OBSTACLE TYPES

Only the imagination and ingenuity of the soldier who designs and emplaces them limits the nature and extent of reinforcing obstacles. The general types of individual obstacles are—

- Demolition obstacles.
- Constructed obstacles.
- Land mines.
- Improvised obstacles.
- Complex obstacles.

In addition, there are phony obstacles, which are not a type of individual obstacle but are representations of actual obstacles that units use to deceive the enemy.

DEMOLITION OBSTACLES

Units create demolition obstacles by the detonation of explosives. There are many uses for demolitions, but some examples are–

- Destroying bridges.
- Creating road craters.
- Creating abatis.

FM 5-250 covers demolitions and the effects of demolitions in detail.

Bridges

The use of existing bridges is critical to the mobility of a military force, especially bridges spanning nonfordable rivers and streams. Demolishing bridges forces the enemy to search for a suitable bypass (another bridge or ford site at a different location) or expend mechanical assault bridging assets to maintain its momentum.

There is no standard planning factor for the destruction of bridges as many variables impact on the materials and the manpower required. See *Chapter 4, FM 5-250,* for details. The maneuver commander decides whether to order a complete or a partial bridge demolition. The complete bridge demolition leaves nothing of the old structure, while the partial demolition saves the near-side spans and abutments. The partial demolition permits easier reconstruction of the bridge.

Road Craters

An RC is an effective obstacle on roads or other high-speed-movement routes, such as

firebreaks. The RC forces the enemy to use earthmoving equipment, blade tanks, or mechanical bridging assets. Generally, there are two types of RCs, hasty or deliberate. The planning factors and material requirements for RCs are in *Chapter 3, FM 5-250.* See *Figure A-1* for an example of the use of an RC.

Abatis

Abatis are only effective if large enough trees are available to stop the enemy force. Abatis can be useful on roads and narrow movement routes. Refer to *Chapter 3, FM 5-250,* for more information. See *Figure A-2* for an example of the use of a standard abatis.

CONSTRUCTED OBSTACLES

Units create constructed obstacles with manpower or equipment and without the use of explosives. Examples of constructed obstacles are–

- Wire obstacles.
- Tetrahedrons and hedgehogs.
- Antitank ditches.

Wire Obstacles

Wire obstacles typically target the dismounted threat. Triple standard concertina is a common wire obstacle; however, there are other types, such as double apron, tanglefoot, and general-purpose barbed-tape obstacles (GPBTOs). Double apron is

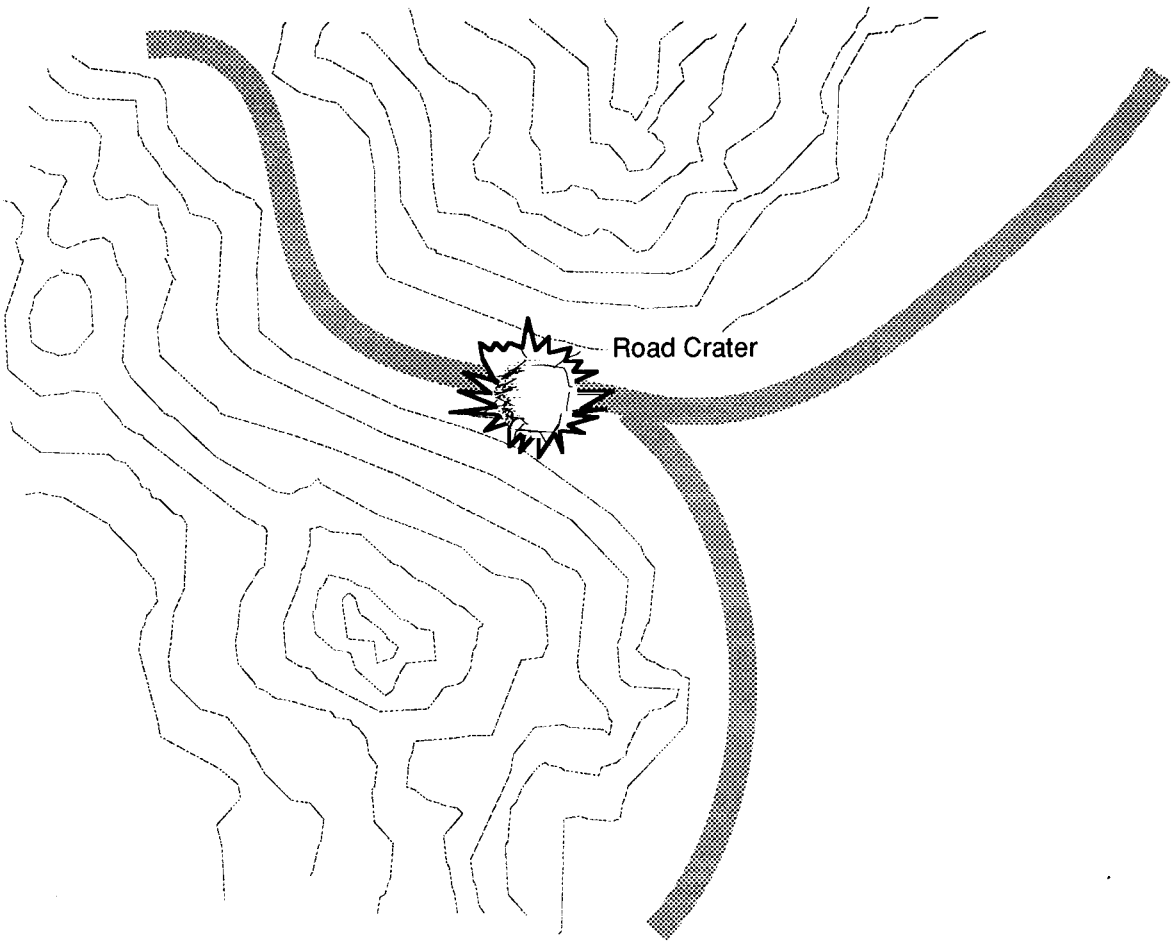


Figure A-1. Road crater.

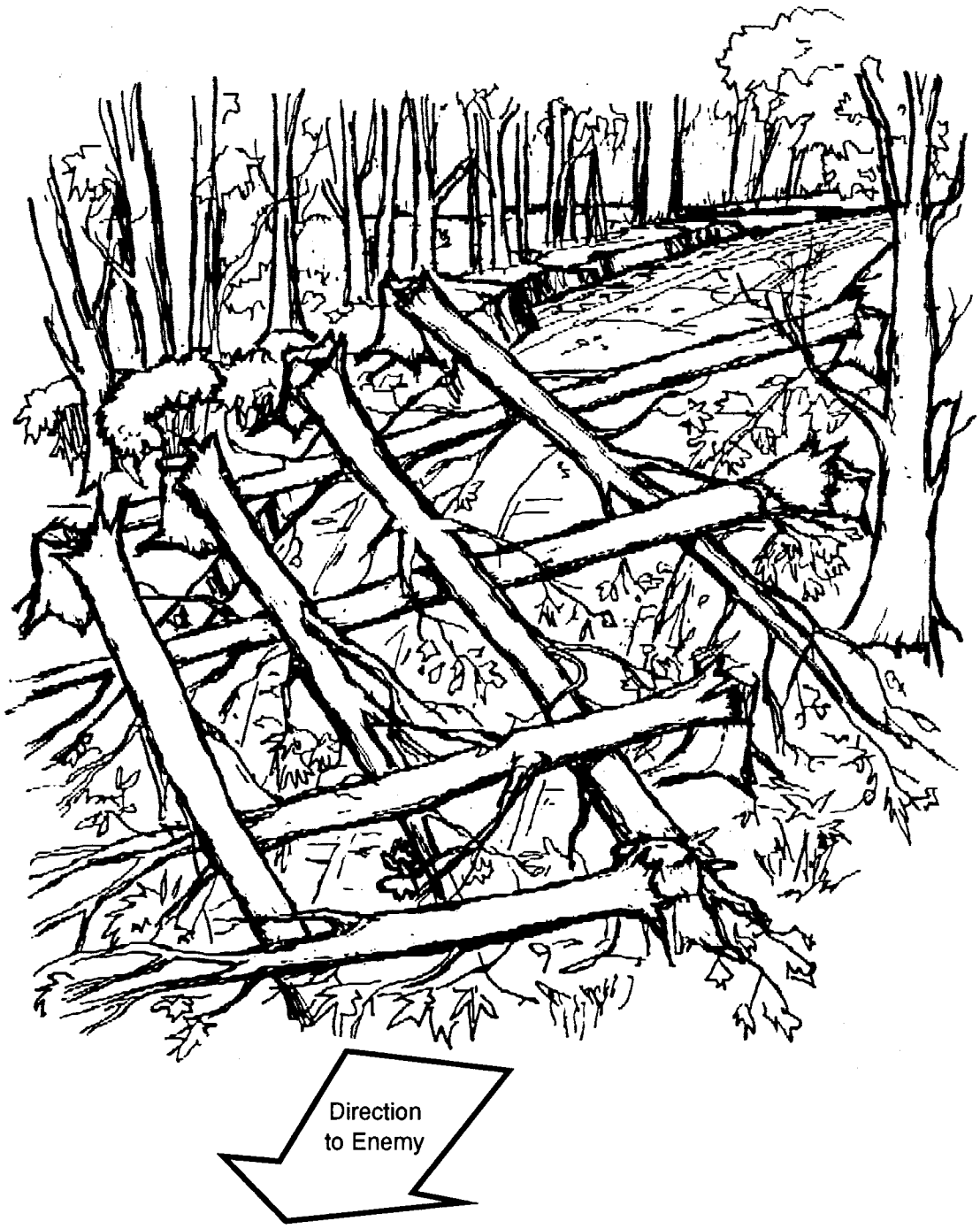


Figure A-2. Abatis.

manpower and material intensive and units typically use it only for deliberate protective obstacles. Tanglefoot works well in tall grass or along a low-water line. The GPBTO is an extremely effective wire obstacle, and soldiers can emplace it from a vehicle. Refer to *Chapter* 3, *FM 5-34* for more information. See *Figure A-3* for an example of standard wire obstacles.

Tetrahedrons and Hedgehogs

Tetrahedrons and hedgehogs target the mounted threat. Tetrahedrons are pyramids with a triangular base and are normally about 1½ meters on each side. Engineers fabricate tetrahedrons from steel beams or use concrete to create a massive tetrahedron. Engineers construct hedgehogs from three or four steel beams joined in the middle to create something similar to a child's giant jack. Both of these obstacles are effective in restrictive terrain. Units commonly use them in urban areas. Their ability to completely stop light vehicles makes them ideal for use in protective obstacles around fixed sites in OOTW.

Antitank Ditches

Units can also use equipment to alter terrain to create constructed obstacles. For example, an AD is a constructed obstacle that is effective against all types of

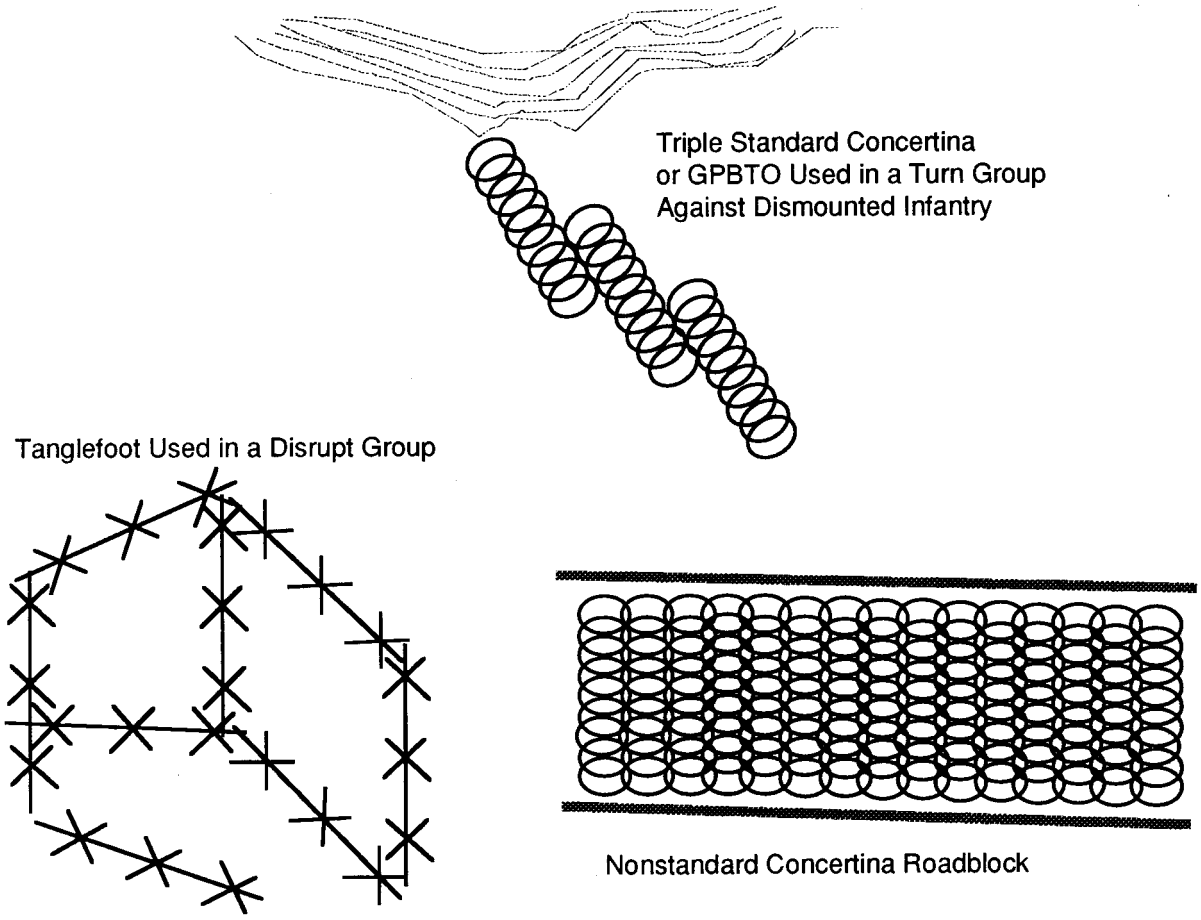


Figure A-3. Wire obstacles.

vehicles. Like minefield, ADs are linear obstacles, but they require that the enemy use a different breaching asset than it does for minefield. Additionally, mine-plow- and roller-equipped tanks cannot cross a breached AD as easily as a normal tank can. There are two basic AD designs, rectangular or triangular (see *Figure A-4).*

The AD supplements turn or block obstacle groups. Units normally do not use ADs for disrupt or fix obstacle groups because of the time and equipment requirements. The commander must realize that the construction of ADs is time and equipment intensive. Typically, there is a trade-off between digging ADs and digging survivability positions.

LAND MINES

Mines are explosive devices emplaced for the express purpose of killing, destroying, or otherwise incapacitating enemy personnel and equipment. Mines affect the enemy in two ways. The first is the damage they inflict on enemy personnel and equipment. Second, mines have a psychological impact. Units that detect mines, or witness the mine effect on other parts of a formation, tend to slow down and seek bypasses to avoid the mine effects. The two general categories of land mines are–

- Conventional mines.
- Scatterable mines.

Conventional Mines

Conventional mines are hand-laid mines that require manual arming. Conventional mining is resource (time, labor, supply, and transportation) intensive. *Part One, FM 20-32,* covers conventional mines and mining in detail.

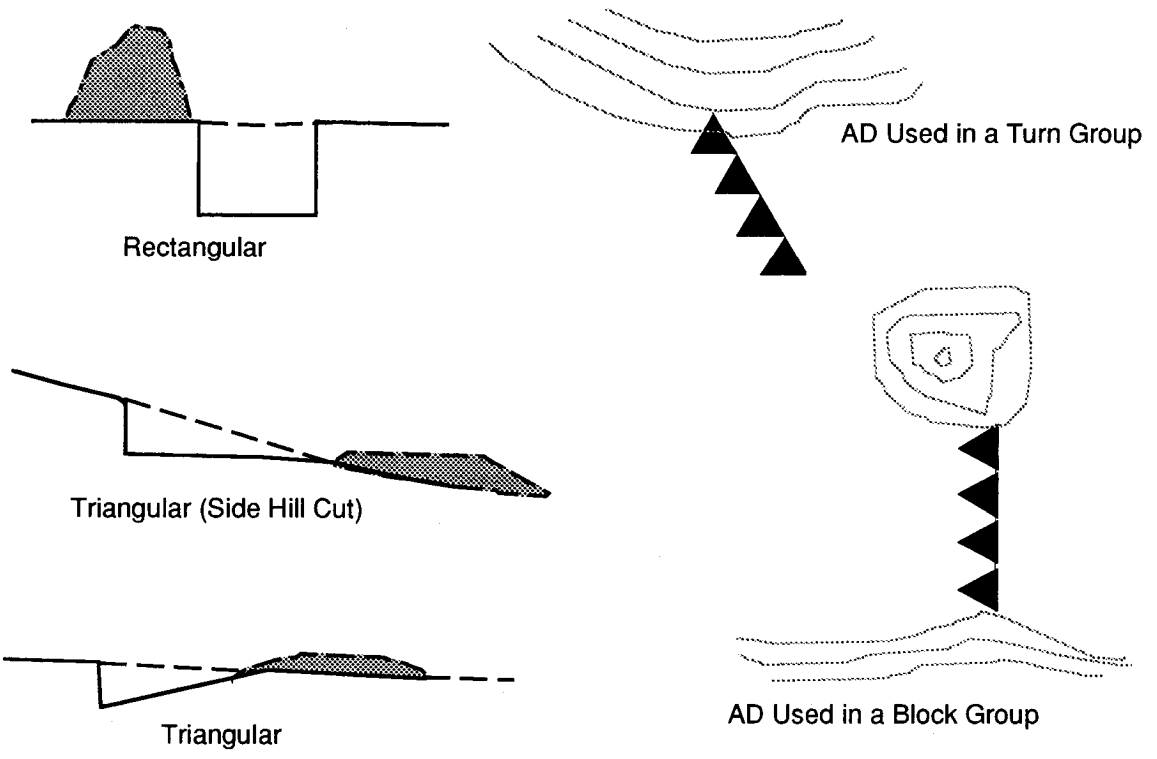


Figure A-4. Antitank ditches.

Scatterable Mines

SCATMINEs are laid without regard to classical pattern and are delivered by aircraft, helicopter, artillery, missile, or ground dispenser. SCATMINEs provide the maneuver commander a flexible, responsive, and lethal mine-laying capability to affect the enemy's ability to maneuver. All US SCATMINEs have a limited active life and self-destruct at a preset time. The duration of the active life depends on the type of mine and delivery system.

SCATMINEs are not an obstacle cure-all for inadequate tactical planning. Their use requires extensive coordination, integration, and control. Indiscriminate use of SCATMINEs causes a rapid depletion of valuable assets. More importantly, the poorly planned use of SCATMINEs can impede friendly movement and cause fratricide. For more detailed information on SCATMINEs and systems, refer to *Part Two, FM 20-32.*

IMPROVISED OBSTACLES

Soldiers and leaders design improvised obstacles with imagination and ingenuity when using available materials and other resources. Possible improvised obstacles include the following:

- Rubbled masonry buildings.
- Controlled fires.
- Flooded areas created by opening floodgates or breaching levees.
- Damaged vehicle hulks used as roadblocks.

COMPLEX OBSTACLES

Units can create complex obstacles to improve the effectiveness of obstacle groups. Complex obstacles are a combination of different types of individual obstacles. For example, an RC reinforced with AT mines is a complex obstacle. The RC requires that the enemy employ its mechanical bridging or blade-breaching assets, while the AT mines require that the enemy use a mine-breaching asset. Together, the RCs and mines create a better obstacle. The key to creating effective complex obstacles is knowing the quantity and capability of the enemy's breaching assets.

A complex obstacle should affect low-density breaching equipment first; then it should affect more common breaching equipment. For example, if the enemy has nine mine plows and three blade tanks, the unit can use an AD and mines to force the enemy to use both breaching assets. This increases the time required to breach. Moreover, by putting the AD before the mines, the enemy must use its lowest density breaching equipment first. If friendly forces destroy the blade tanks, they reduce the probability of the enemy breaching the complex obstacle.

Another example of complex obstacles is using AP mines, triple standard concertina, tanglefoot, and AT mines. The wire and AP mines strip the enemy's dismounted infantry away from assaulting tanks. This makes both more vulnerable and enables the defending force to concentrate on one type of threat. The AT mines prevent armored vehicles from dashing through the wire unimpeded.

PHONY OBSTACLES

Phony obstacles play a key role in obstacle protection by helping hide a unit's actual obstacles from the enemy. They can also help a unit compensate for shortages of obstacle resources. A unit can mix actual obstacles with phony obstacles within an obstacle group. Naturally, this implies risk, and commanders must ensure that they consider the risk of using phony obstacles.

Commanders must also ensure that the emplacing unit creates a phony obstacle

that will have the desired result on the enemy. An example is a shallow excavation combined with a loose soil berm to simulate an AD. Another technique is to use minefield markings where there are no minefield. To be successful, this technique normally requires that the unit establish a precedent. Highly visible minefield markings in a disrupt obstacle group in forward areas provide a visual cue to the enemy concerning minefield. Using the same markings without minefield in a fix obstacle group may cause the enemy to assume that there is an actual minefield where none exists.

INDIVIDUAL OBSTACLE DESIGNS

The remainder of this appendix provides guidelines for individual obstacles. Units use individual obstacles as building blocks for obstacle groups. Standard obstacles allow rapid estimating for resourcing (time, manpower, equipment, and materials) that is critical in making the force's obstacle effort effective, efficient, and timely. They allow units to train on the installation of individual obstacles as drills.

FMs 5-34, 5-102, and 20-32 provide details on specific standard obstacles.

These standard obstacles are not the only types of obstacles that units should consider. Instead, units should consider modifying standard obstacles or creating their own standard obstacles based on METT-T and other resource availability. For example, the standard minefield in *FM 20-32* are focused on a soviet-style tank and motorized infantry threat. These minefield may not be appropriate for a mixed force of light infantry and tanks.

The following paragraphs provide some basics for designing minefield based on the type of threat.

ARMOR THREAT

Units may need to design minefield for armor threats other than soviet-style forces. The next few paragraphs describe some considerations for designing minefield based on an enemy with armor companies of 12 to 18 combat vehicles. These are minefield that a unit can use as building blocks for obstacle groups in mostly open terrain.

Width

An enemy armored company of 12 to 18 combat vehicles will have a probable frontage of 500 meters when deployed. To affect the enemy, half the enemy company frontage (250 meters) should encounter the minefield. An individual obstacle of 250 meters frontage is an appropriate-size building block.

Depth

Minefields must have enough depth to support the obstacle effect based on the enemy's breaching capability. If the commander wants a disrupt or fix effect, the minefield should require the enemy to expend at least one breaching asset (for example, 100 meters if the enemy has a mine-clearing line charge (MICLIC)). For the turn-and-block effect, the depth should increase to force the enemy to expend more breaching assets. For an enemy not equipped with line charges, the depth can decrease. If the enemy has no mechanical breaching assets, the depth can decrease even further.

Antitank Mines

The two options are track-width and full-width fuzed AT mines. Compared to the full-width fuzed mines, track-width fuzed mines have a lower probability of encounter. Track-width fuzed mines require a density of 1.0 per linear meter of front; however, adding one row of full-width fuzed mines can reduce the resources required

while increasing the probability of encounter for the minefield. This results in one row of full-width fuzed mines and two rows of track-width fuzed mines.

Antipersonnel Mines

The minefield focuses on the mounted threat, so if the enemy has mounted breaching assets, AP mines normally will not make much of a difference. However, if the enemy lacks mechanical breaching assets, adding AP mines can help prevent dismounted breaching.

Antihandling Devices

The emplacing unit determines the requirement for AHDs based on the threat. Normally, units use AHDs only if they expect covert or other dismounted breaching attempts.

Irregular Outer Edges (IOEs)

The purpose of IOEs is to confuse the enemy about the orientation of the minefield and to increase the probability of an encounter. There may be cases where an IOE is desirable, such as a fix or block effect. The IOE does not have to be part of the standard minefield.

LIGHT THREAT

Designing standard minefield to achieve a specific obstacle effect against a light force is a unique challenge. There are no strict doctrinal frontages associated with an enemy light infantry company; however, a typical march formation for a dismounted infantry company has a frontage of 40 to 200 meters. The following paragraphs describe considerations for designing standard minefield for a light threat.

Width

An enemy infantry company typically consists of three platoons. In march (column) formation, it has a frontage of 40 to 200 meters. Using 200 meters as the enemy's maximum frontage, the standard minefield must target half of its frontage (100 meters). Camouflaging the mines and total pattern aids tremendously in increasing the effectiveness of the disrupt and fix minefield.

Depth

A 45-meter depth complicates a light infantry's breaching attempt. A light force employs grapnel hooks, hand-placed explosives, bangalore torpedoes, and portable explosive line charges. The 45-meter depth requires multiple uses of those assets.

Antitank Mines

The minefield focuses on the dismounted threat. Normally, AT mines are useful only if the enemy has vehicles.

Antipersonnel Mines

The M16A1 AP mine provides the best mix of lethality and density for the disrupt or fix minefield. The M18 Claymore mine is another choice. The M14 AP can be used; however, it requires a much higher linear density.

Antihandling Devices

The emplacing unit determines the requirement for AHDs based on the threat. At least some mines, especially those on the leading edge of the minefield, should have AHDs.

Irregular Outer Edges

The IOE's purpose is to confuse the enemy about the orientation of the minefield and to increase the enemy's probability of encounter. Use of the IOE is normal only in relatively open terrain.

Leaders should not limit their view of reinforcing obstacles only to minefield.

Note that throughout this manual, individual obstacles are depicted as shaded rectangles, unless a specific variety of obstacle is discussed. Those shaded rectangles represent individual obstacles. The actual type of individual obstacle depends on METT-T, Leaders should consider the full range of individual obstacle varieties when installing individual obstacles. Leaders have as many options as their imaginations allow.

INDIVIDUAL OBSTACLE ARRAY

The standard row minefield in *FM 20-32* are classified as disrupt, fix, turn, and block. Although these minefield are classified that way, the array of individual obstacles is what supports the obstacle effect. Units may use any of these minefield or other obstacles to achieve an obstacle effect if the array supports the desired effect. Figure A-5 shows possible obstacle arrays to support specific effects.

It also is important to fit standard obstacles to the terrain. For example, units do not need to lay row minefield in a straight line. They must array the obstacle based on the weapon systems and the terrain to achieve a specific effect. *Figures A-6 through A-8, pages A-10 and A-11,* show some examples of how to use standard obstacles in different arrays to achieve an obstacle effect.

Standard obstacles enable planners at all echelons to estimate resource requirements based on linear obstacle requirements. Like all planning factors, they provide a base for estimating requirements and must be adjusted to the factors of METT-T. Production rates decrease because of limited visibility; nuclear, biological, and chemical (NBC) threat environment; reduced troop strength or proficiency; and adverse weather conditions.

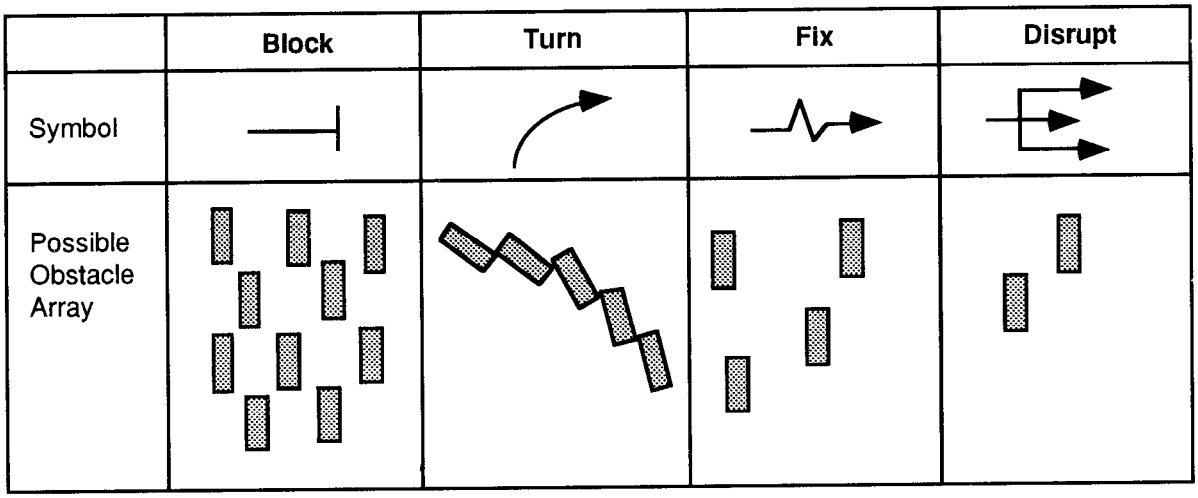


Figure A-5. Possible array of obstacles.

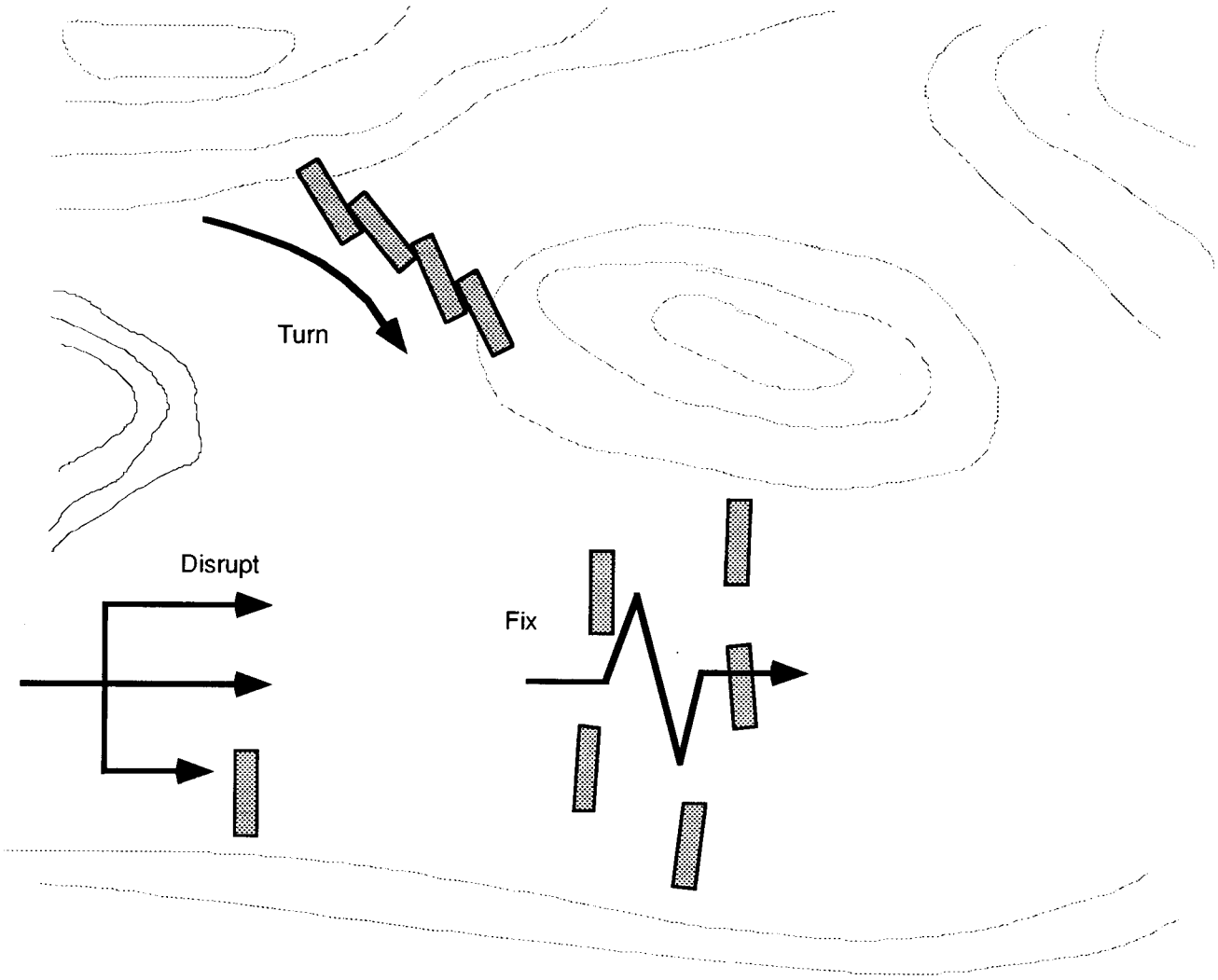


Figure A-6. Standard obstacles in open terrain.

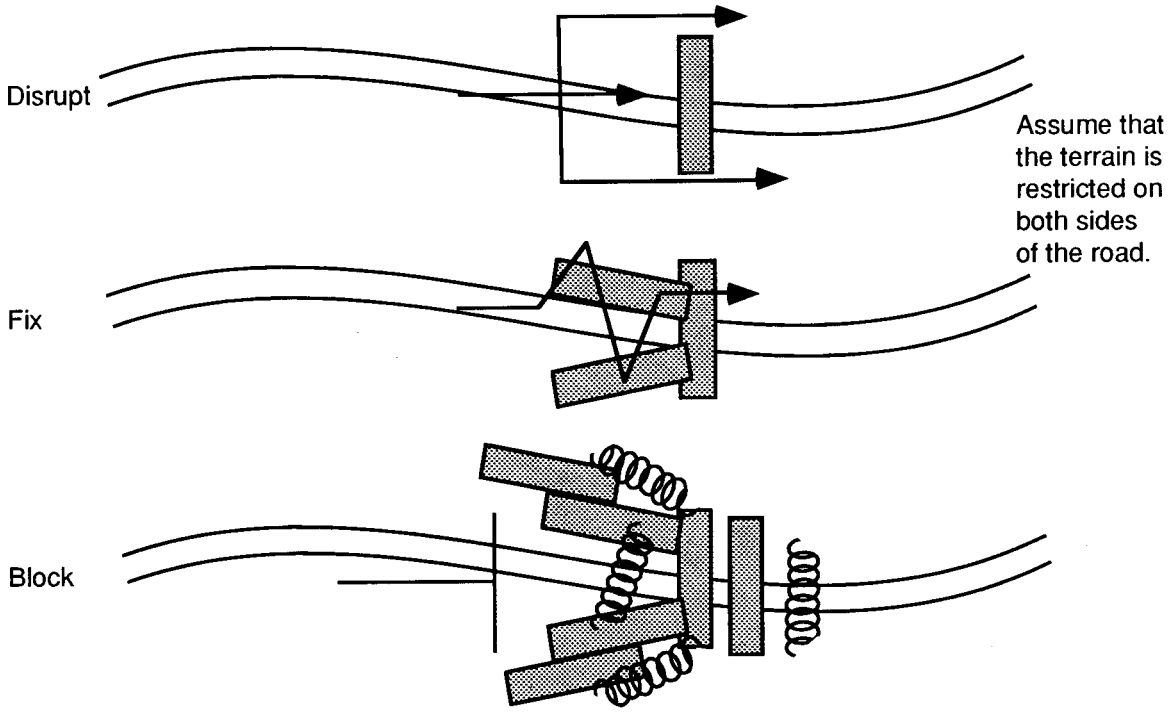


Figure A-7. Standard obstacles on a narrow mobility corridor.

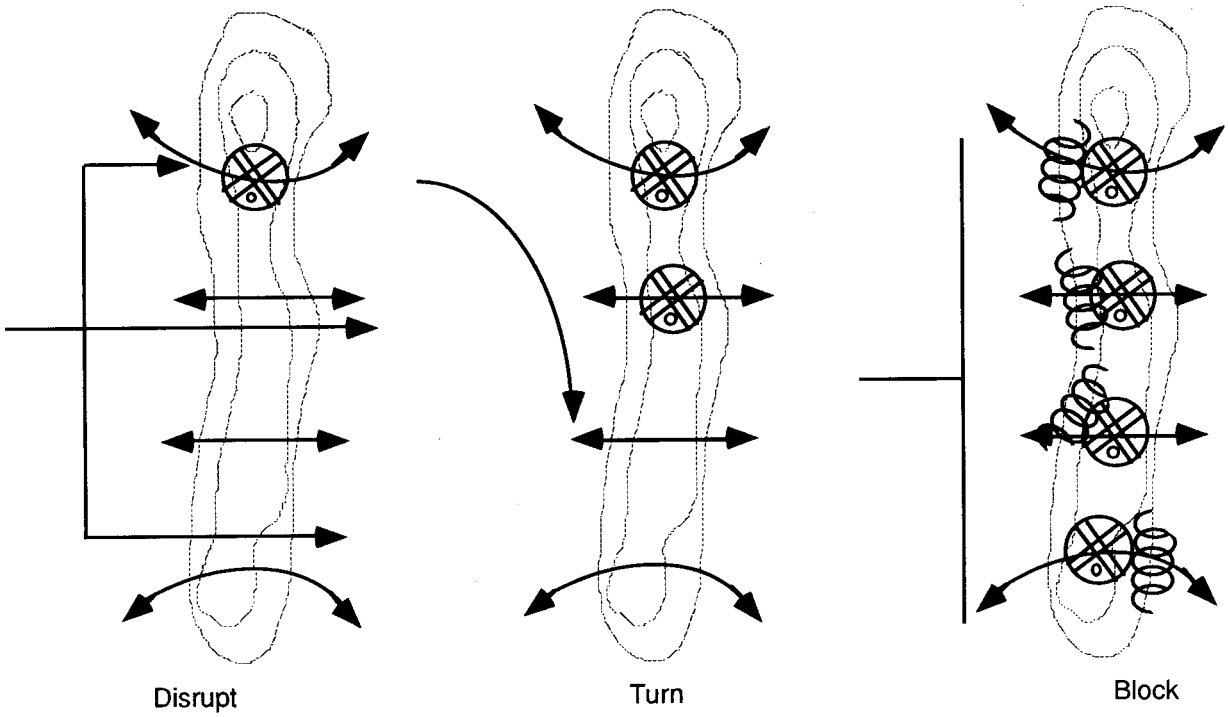


Figure A-8. Standard obstacles in restrictive terrain.

Appendix B

Obstacle Numbering, Reporting, Recording, and Tracking

This appendix describes the obstacle numbering system and the requirements for obstacle reporting and recording.

OBSTACLE NUMBERING

The obstacle numbering system shown in *Table B-1, page B-2,* consists of 11 alphanumeric characters and an obstacle status symbol character. This number is compatible with the Tactical Engineer Command and Control System (TECCS) that augments the Maneuver Control System (MCS). An obstacle number provides the following information concerning an individual obstacle:

- HQ that established the obstacle zone in which the obstacle is located.
- Obstacle zone designation (if any).
- Obstacle belt designation within the obstacle zone (if any).
- Obstacle group designation within the obstacle belt.
- Individual obstacle type.
- Individual obstacle number.
- Obstacle status.

If units do not use obstacle zones and belts, or if the HQ directs obstacles outside an obstacle zone or belt, an asterisk is used in place of the obstacle zone or belt designator.

The designation for the HQ is a letter followed by three numbers. For example, XVII Corps is shown as Z017; 23d Armored Division is shown as A023; and the 103d Airborne Division is shown as I103.

Obstacle zones are indicated by a single letter starting with "A" and continuing in sequence. Obstacle Zone A in XVII Corps is distinguished from Obstacle Zone A in 77th ID by the HQ designation (Z017-A versus 1077-A). The second obstacle zone in 77th ID would be Obstacle Zone B (I077-B).

Obstacle belts are indicated with a single digit following the obstacle zone designator starting with "l" and continuing in sequence. For example, the first obstacle belt in Obstacle Zone C of the 5th Cavalry Division is shown as C005-C1.

Obstacle groups are depicted by a single letter starting with "A" and continuing in sequence. For example, the first obstacle group in Obstacle Belt 2 of Obstacle Zone B in the 77th ID is I077-B2A.

The individual obstacle type is expressed by one or two letters as shown in *Table B-2, pages B-3 and B-4.* For example, AD obstacles in I077-B2A are shown as I077-B2A-AD. Standard block minefield in the same group are shown as I077-B2A-MB.

Table B-1. Obstacle numbers.

Character	Description
1 through 4	Alphanumeric descriptions of the HQ type and numerical designation that established the obstacle zone. Character 1 designates the unit type with a letter (A, armor division; C, cavalry division; I, infantry division; and Z, corps).
5	Letter indicating the obstacle zone. If there is no obstacle zone, an asterisk is used.
6	Number indicating the belt number in the obstacle zone. If there is no belt, an asterisk is used.
7	Letter indicating the group in the obstacle belt.
8 and 9	Letters indicating the obstacle type (see *Table B-2, pages B-3 and B-4).*
10 and 11	Two numbers indicating the obstacle number in the group.
12	One of four characters indicating the obstacle status: • / (slash) = planned obstacle. • - (dash) = obstacle being prepared. • + (plus) = prepared, but not executed obstacle. (The + is for reserve demolition targets and may indicate a readiness state of safe or armed.) • x = executed or completed obstacle.

The individual obstacles in an obstacle group are indicated by a two-digit number starting with "01" and continuing in sequence. Therefore, the first block minefield in obstacle group I077-B2A is I077-B2A-MB01. The second block minefield in the group is I077-B2A-MB02. If the obstacle group consists of a single obstacle, it is also shown as I077-B2A-MB01.

If the corps or division orders the emplacement of an obstacle group outside an obstacle zone, then there is no obstacle zone or belt designator. Instead, units replace the obstacle zone and belt designators with asterisks (*). For example, if XVII Corps orders the demolition of a bridge (abutment only) as a corps reserve obstacle and this is the first such obstacle, then the obstacle is indicated as Z017-**A-BA01. If the 1st Brigade, 77th ID, orders an ADAM/RAAM scatterable minefield in Obstacle Zone B and outside all obstacle belts, the designation is I077-B*A-SF01.

The obstacle status symbol is the last character of the obstacle number. The status symbol shows whether the obstacle is—

- Planned (/)
- Being prepared (-).
- Prepared, but not executed (+).
- Executed or completed (x).

For example, if the first of the block minefield discussed in the previous paragraph is completed, the obstacle number is I077-B2A-MB01X. If the corps reserve obstacle discussed in the previous paragraph is prepared, the obstacle number is Z017-**A-BA01(+).

Obstacle numbering for protective obstacles may require procedures that vary slightly from those described. Units should report protective obstacles; however, identifying the individual obstacles is difficult using the obstacle numbering guidelines without guidance from the higher HQ. A technique is for

Table B-2. Obstacle type abbreviations.

M—Minefield/Munition Field		W—Wire Obstacle	
MB	Block	WA	Double-apron
MC	Chemical	WC	Concertina
MD	Disrupt	WF	Tanglefoot
MF	Fix	WG	General-purpose, barbed tape
MH	Hasty protective	WN	Nonstandard
MN	Nonstandard	WR	Roadblock
MO	Point	WT	Triple-standard
MP	Protective	**S—Scatterable Minefield/Munition Field**	
MQ	Nuisance	SB	Gator
MS	Standard-pattern	SF	ADAM and RAAM
MT	Turn	SM	MOPMS
MU	Dummy/decoy	SV	Volcano
A—Miscellaneous		SW	Scatterable mines (generic)
AB	Abatis	**H—Hand-Emplaced Munitions**	
AC	Chemical by explosives	HC	Claymore
AD	AT ditch	HH	Hornet/WAM
AF	Thermobaric or flame	HO	Other
AH	Log hurdle	HS	SLAM
AL	Log crib or log obstacle	**I—Improvised Explosive Devices**	
AM	Movable obstacle (car, bus)	ID	Directional, special-purpose explosive hazard
AN	Expedient nonstandard obstacle		
AP	Post obstacle (hedgehog, tetrahedron)	IO	Omnidirectional, special-purpose explosive hazard
AR	Rubble		

Table B-2. Obstacle type abbreviations (continued).

AT	AT ditch with AT mines	**B—Bridge Demolition**	
AW	Earthwork (berms, parapets, dunes, pits)	BA	Abutment
		BC	Abutment and span
T—Booby Traps		BS	Span
TA	Booby-trapped area	**R—Road Crater**	
TB	Booby-trapped bodies	RD	Deliberate
TE	Booby-trapped equipment	RH	Hasty
TM	Booby-trapped material	RM	Mined
TP	Booby-trapped passage/ confined space	**U—Unexploded Ordnance**	
		UC	Chemical UXO hazard area
TS	Booby-trapped structure	UH	UXO hazard area
TV	Booby-trapped vehicle	UN	Nuclear hazard area

units to assign default obstacle zone, belt, and group designators for protective obstacles outside control measures. For example, 77th ID assigns W, X, Y, and Z (it is unlikely that the division will ever have enough actual obstacle zones to require these letters) as default obstacle zone designators for subordinate units as follows:

- W – 1st Brigade.
- X – 2d Brigade.
- Y – 3d Brigade.
- Z – Division rear.

The 1st Brigade assigns default obstacle belts W1, W2, and W3 to TF 1-2, TF 2-3, and TF 3-4 respectively. TF 1-2 then assigns default obstacle group designators W1A, W1B, W1C, and W1D to its four company teams. Protective obstacles can now be linked directly to specific company teams. The first protective minefield that Team A, TF 1-2 emplaces has the obstacle number I077-W1A-MP01X.

OBSTACLE REPORTING

An obstacle report is an oral, electronic, or written communication concerning obstacle activities. The local command specifies the report format. The emplacing unit commander submits it through operational channels to the G3/S3 of the authorizing HQ. The HQ integrates the report with terrain intelligence and disseminates it with tactical intelligence. Units send these reports by the fastest, most secure means available. Failure to disseminate obstacle information rapidly could result in friendly

casualties. *Figure B-1, page B-6,* summarizes the obstacle report flow at the corps level and below.

Units must submit the following reports for every obstacle (with exceptions noted):

- Report of intention.
- Report of initiation.
- Report of completion.

REPORT OF INTENTION

The use of a report of intention depends on the use of obstacle-control measures or an OPLAN.

Obstacle-Control Measures

If the higher HQ has designated obstacle-control measures, such as obstacle zones or belts, units do not need to submit the report of intention. The authorization to install obstacles is given when the higher HQ establishes the obstacle-control measure.

Units must submit a report of intention for every obstacle if the higher HQ did not establish obstacle-control measures. Units must submit a report of intention to notify their higher HQ before planning to emplace an obstacle.

Operation Plan

Conventional obstacles that are part of an OPLAN approved by the authorizing commander do not require a report of intention because inclusion in an OPLAN implies an intention to emplace obstacles.

The report of intention doubles as a request when units initiate it at levels below emplacement authority. The report includes the following:

- Tactical purpose of the obstacle.
- Estimated number and type of mines to be emplaced.
- Location of obstacle.
- Proposed start and completion times.
- Type of obstacle.
- Placement of mines (surface-laid or buried).
- Use of AHDs on mines, if applicable.
- Location and width of lanes and gaps and how they are marked.

REPORT OF INITIATION

A report of initiation is mandatory. It informs higher HQ that emplacement has begun and that the area is no longer safe for friendly movement and maneuver. The report specifies the time that emplacement began and identifies the location and target numbers of obstacles. The scatterable mine warning (SCATMINWARN) notifies affected units that SCATMINEs will be emplaced. The SCATMINWARN report provides affected units with the necessary warning to plan and execute their operations. Units send the report before or immediately after they have emplaced mines. *Figure B-2, page B-7,* shows a sample of the SCATMINWARN format.

REPORT OF COMPLETION

A report of completion is the report from the actual emplacing unit, through channels, to at least corps level. It informs higher HQ that the obstacle is complete and functional. If required, units follow a report of completion with completed *DA Form 1355, DA Form 1355-1-R,* or scatterable minefield report and record (see *Figure B-3, page B-7).*

ADDITIONAL REPORTS

Two additional reports that may be required at different times are—

- Report of progress.
- Report of transfer.

Report of Progress

During the emplacing process, the commander may require periodic reports on the work completed.

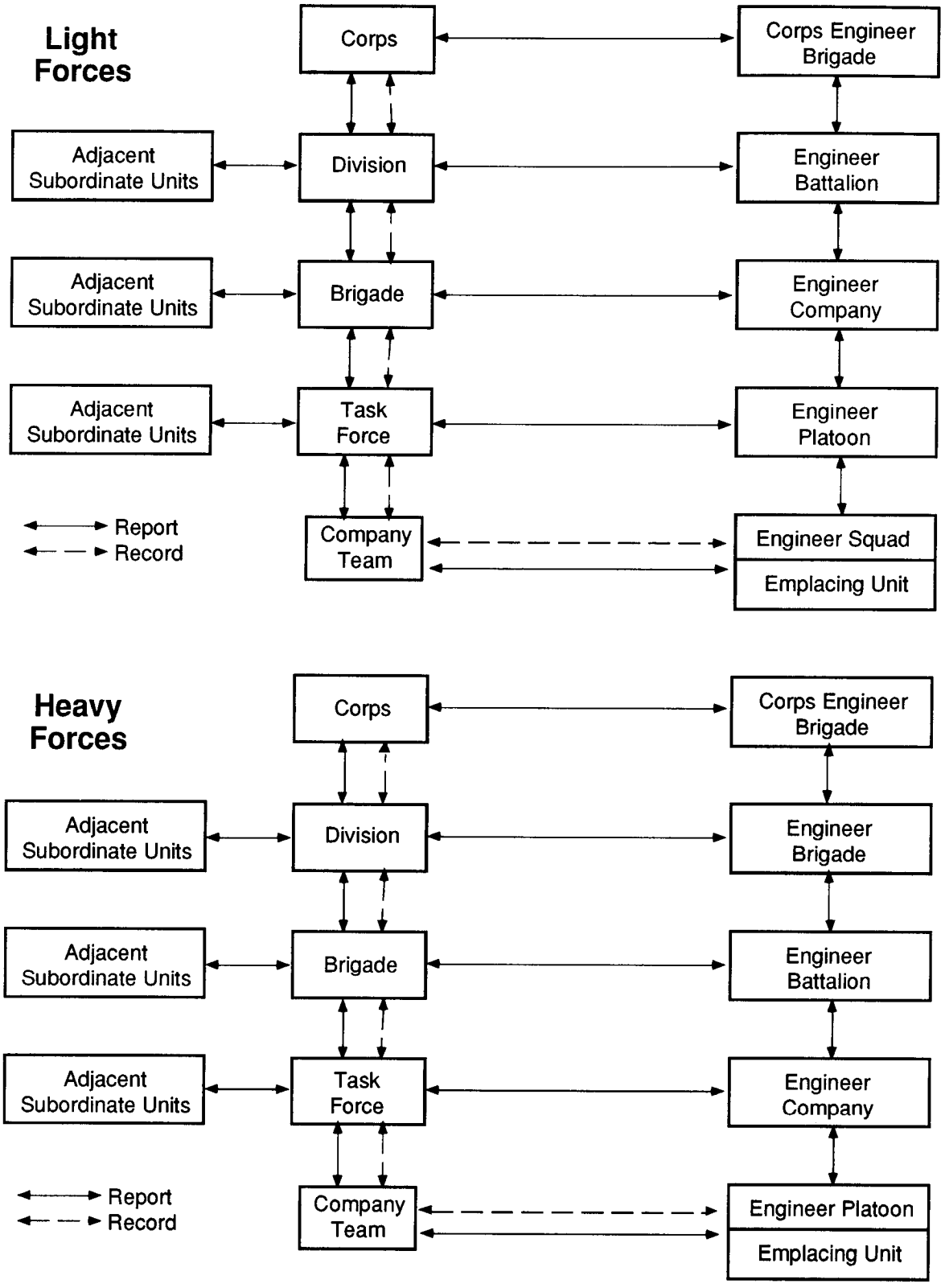


Figure B-1. Obstacle report flow.

Line	Message
Alpha	Emplacing System
Bravo	Antitank YES/NO
Charlie	Antipersonnel YES/NO
Delta	Number of Aim Points/Corner Points
Echo	Grid Coordinates of Aim Points/Corner Points and Size of Safety Zone
Foxtrot	Date-Time Group (DTG) of Life Cycle

Figure B-2. Sample of SCATMINWARN format.

Line Number	Information Required	Data (Instructions on Back)
1	Approving Authority	Commander, 3 AD
2	Target Obstacle Number	2XXX0157
3	Type of Emplacing System	Artillery
4	Type of Mine	Antitank/Antipersonnel
5	Life Cycle	081610Z - 082020OCT90
6	Aim Point/Corner Points of Minefield	MB 10102935
7		
8		
9		
10		
11		
12		
13		
14		
15	Size of Safety Zone from Aim Point	500 m
16	Unit Emplacing Mines/Report Number	2/48FA/2
17	Person Completing Report	SFC Hollins
18	DTG of Report	061645ZOCT90
19	Remarks	Not Applicable

Figure B-3. Sample scatterable minefield report and record.

Report of Transfer

A commander transfers obstacle responsibility to another commander with a report of transfer. The relieving and relieved commanders sign this report.

OBSTACLE RECORDING

Obstacle recording is an electronic or written communication describing the emplacement of the obstacle. Records are normally technical in nature, and there is very specific guidance on the recording of minefield. Units record tactical and deliberate protective minefield using *DA Form 1355.* They record hasty protective minefield on *DA Form 1355-1-R.* Units use the scatterable minefield report and record to report and record scatterable minefield (see *Figure B-3, page B-7).* The local command specifies how to record obstacles other than minefield.

Obstacle records contain the following information, as a minimum:

- Location of obstacle.
- Type of obstacle.
- Number and type of mines emplaced, if applicable.
- Placement of mines (surface-laid or buried), if applicable.
- Use of AHDs, if applicable.
- Location and width of lanes and gaps, if applicable.
- Description of any marking, if applicable.

The procedures for completing *DA Form 1355, DA Form 1355-1-B,* or scatterable minefield report and record are in *FM 20-32.*

OBSTACLE TRACKING

Obstacle tracking consists of the following components:

- Collation of obstacle completion reports and other reports of identified obsta - cles, such as UXO and enemy obstacles.
- Dissemination of the collated information to friendly units that the obstacles may affect.
- Maintenance of the records that identify obstacle locations for use in planning future operations or in clearing obstacles after the end of hostilities.

The G3/S3 is responsible for tracking obstacles but is assisted by the engineer and fire support staffs. Friendly force obstacle reports go upward through operational and engineer channels. Reports of enemy obstacles may arrive through a variety of channels based on intelligence collection, maneuver contact, or other means. Normally, the staff engineer collates these reports and records and maintains the information on these obstacles.

Eventually, detailed written reports and records, down to individual obstacles, flow through channels to the corps; however, for immediate tracking, each level requires a different level of detail displayed graphically. At corps level, immediate requirements are graphics showing brigade obstacle belts. The division tracks the locations of obstacle groups graphically. The brigade plots the locations of individual obstacles on overlays. This provides enough information for immediate planning concerns. If a corps or division staff attempts to plot individual obstacles, the end result is probably an inaccurate overlay. As written reports and records arrive at corps level, the corps begins to develop a data base for future planning and eventually for clearance of all obstacles.

Reports of friendly UXO normally come from fire-support units or from Air Force or Navy aviation liaison officers. The fire-support cell normally collates these reports and maintains the record of these items.

The G3/S3 must decide how much of this information to disseminate to subordinate units. He also must decide what level of detail is necessary. Simple overlays depicting areas suspected of having large quantities of UXO, and a brief description of the UXO and its hazards, may be useful to subordinate commanders. They may choose to plan movements around those areas or ensure that their subunits take appropriate precautions in those areas. Subordinate commanders may require more detailed information if they must move through an area where another unit (or the enemy) previously emplaced tactical obstacles. In this case, the commander may need an overlay or listing of all obstacles in the area with as much detail as is available.

Appendix C

Obstacle Resourcing and Supply Operations

This appendix describes obstacle resourcing and supply from corps to emplacing unit level. First, it concentrates on how units plan to resource obstacles in terms of Class IV and Class V obstacle materials, manpower, and equipment. Second, it describes the flow of obstacle materials and offers some techniques for ensuring efficient supply operations.

OBSTACLE RESOURCING

At company team level, the emplacing unit and company team commander can easily identify the resources required for individual obstacles. However, at TF level, the exact requirements are less clear. The exact requirements become increasingly unclear at each higher level. The staff at each level needs a method for estimating obstacle resource requirements to make the necessary allocations to subordinate units. The two techniques for estimating obstacle resource requirements are—

- Requirement-based resourcing.
- Capability-based resourcing.

These techniques provide guidelines for requisitioning and moving resources.

REQUIREMENT-BASED RESOURCING

One technique is to resource subordinate units with obstacle materials and manpower based on anticipated requirements. These requirements are based on the tentative control measures the staff used while developing the obstacle plan (see *Chapter 4).* The staff arrays obstacle-control measures based on the array of friendly forces two levels down. For example, the division staff draws tentative obstacle belts to support the tentative array of TFs in the scheme of maneuver. The staff combines the obstacle belts into obstacle zones and allocates resources for the obstacle zones based on the tentative obstacle belts.

The staff multiplies the width of the AA for the tentative obstacle-control measure at the lower level by the obstacle-effect resource factor (see *Table C-1, page C-2).* The resource factor used depends on the obstacle effect. The staff assumes an obstacle effect for the tentative obstacle-control measures based on how it thinks the subordinate unit will fight the battle.

This provides the linear obstacle effort required for the obstacle-control measure. *Figure C-1, page C-2,* shows the relationship

Table C-1. Obstacle-effect resource factor.

Obstacle Effect	Resource Planning Factor
Disrupt	0.5
Turn	1.2
Fix	1.0
Block	2.4

between the resource factor for each obstacle effect, the AA width, the total linear obstacle effort required, and a possible array of individual obstacles. The staff translates the linear effort required for all the tentative obstacle-control measures into resources required using standard planning factors and obstacle packages. It sums the total resources required for the tentative obstacle-control measures within each subordinate unit's area of operations. It then allocates resources to the subordinate units based on the resources required for the obstacles in its areas of operations.

Figure C-2 shows the obstacle plan from the division scenario in *Chapter 4* (to include the tentative obstacle belts used to develop the plan). *Table C-2, page C-4,* shows an example of the requirement-based resourcing technique based on that scenario.

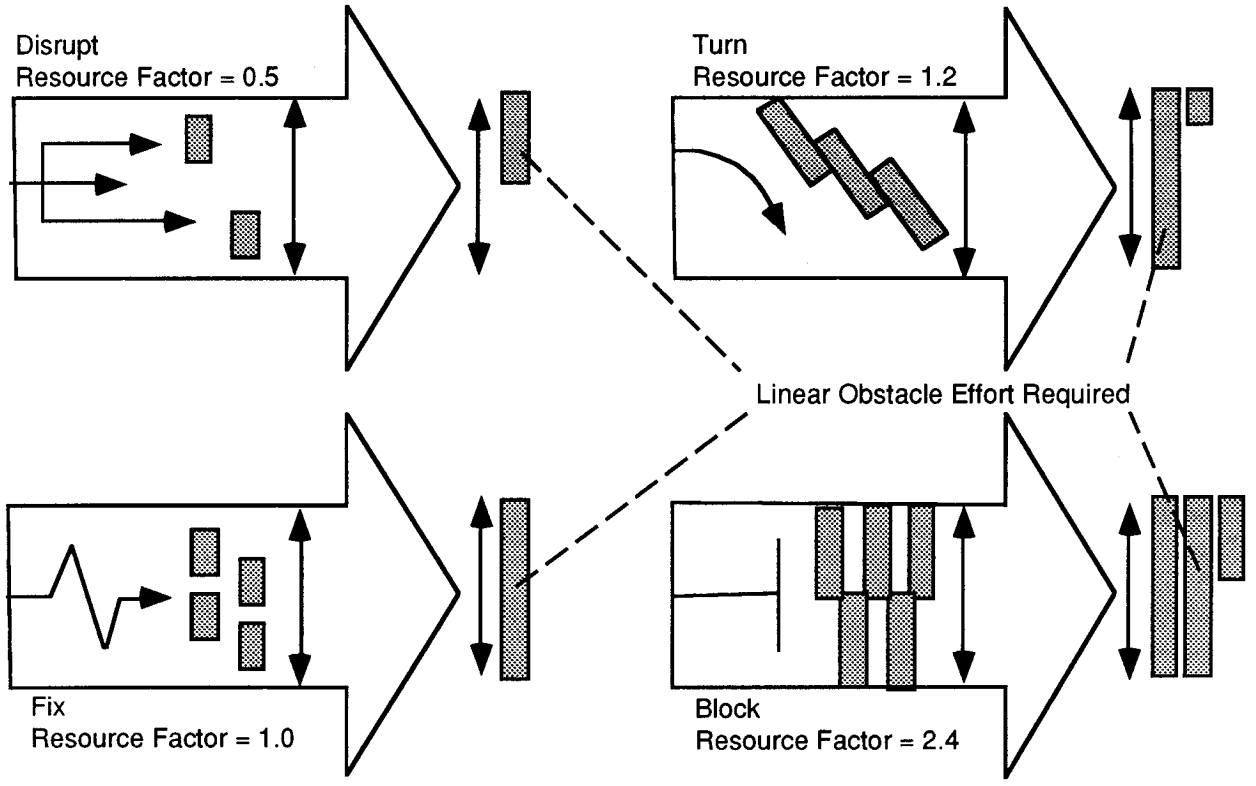


Figure C-1. Obstacle resource factor.

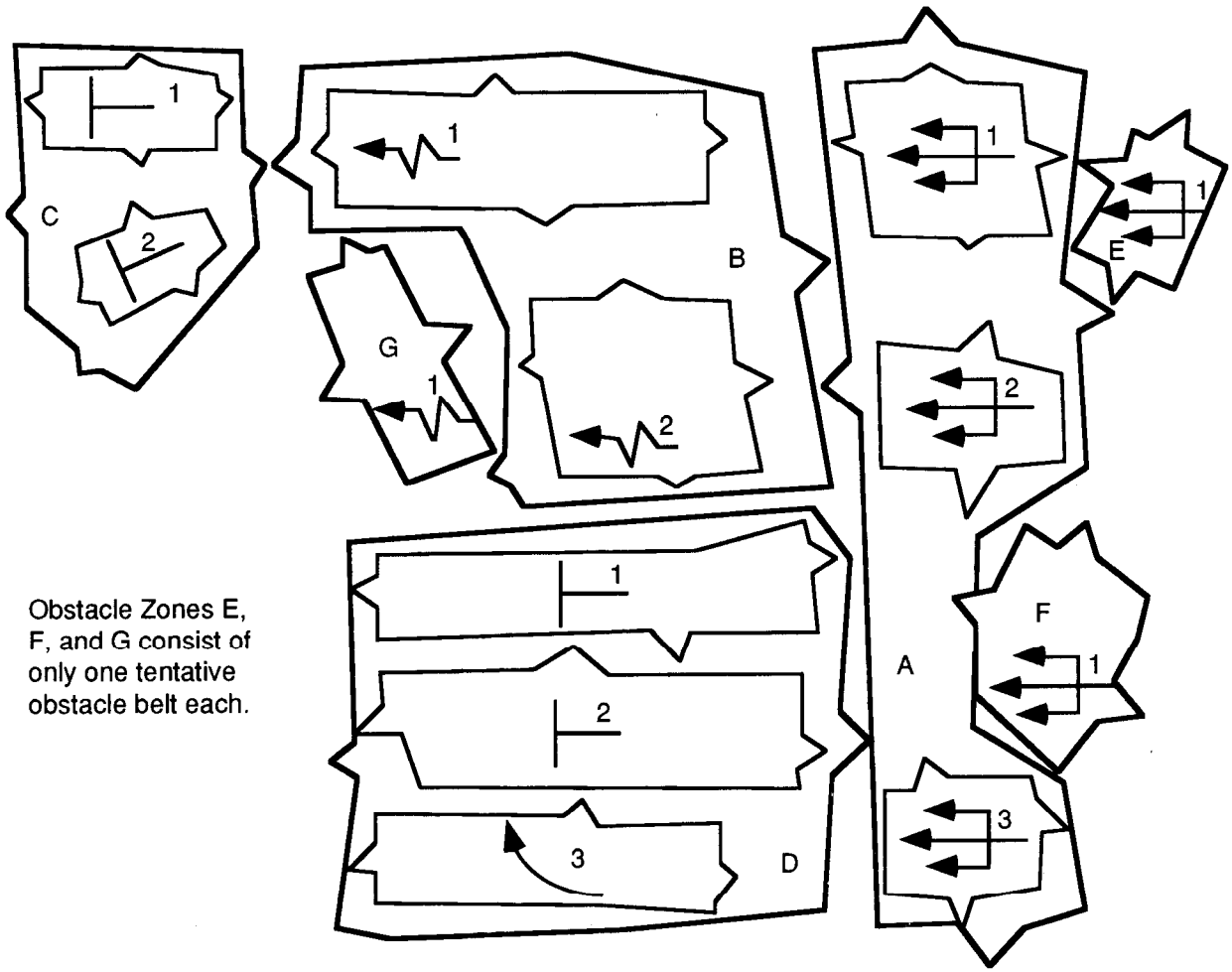


Figure C-2. Division obstacle plan.

The division staff developed seven obstacle zones, A through G (column 1). It used tentative obstacle belts (column 2) to develop the obstacle zones. The staff assumed an obstacle effect (column 3) for each tentative obstacle belt based on how it thought the brigade commanders would fight the battle. It determined the resource factor (column 4) based on the assumed obstacle effect. It multiplied the AA widths (column 5) by the resource factor to determine the total linear obstacle effort required (column 6) for each tentative obstacle belt.

The division used the standard row minefield from FM 20-32 to determine resource requirements (it could just as easily have used other standard obstacles dependent on METT-T). The staff divided the linear obstacle effort required by the frontage of the appropriate standard row minefield (column 7) to determine the number of minefield required (column 8). The staff then multiplies the number of minefield required by the number of mines and platoon hours required for each minefield (columns 9 and 10 respectively). The staff totals the requirements for mines (column 11) and platoon hours (column 12) for each obstacle zone.

Using the zone totals (columns 13 and 14), the staff can now allocate platoons and

Table C-2. Requirement-based resourcing.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	Conversion of PHs Into Engineer Units
Zone	Belt	Effect	Resource Factor	AA Width	Linear kms	MF Frontage	# MFs	Mines/ MF	PHs/ MF	Mines Req	PHs Req	Mines/ Zone	PHs/ Zones	
A	1	Disrupt	0.5	5	2.5	250	10	126	1.5	1,260	15	3,276	39	2 platoons = 1 engineer company for 2 days
	2	Disrupt	0.5	4	2.0	250	8	126	1.5	1,008	12			
	3	Disrupt	0.5	4	2.0	250	8	126	1.5	1,008	12			
B	1	Fix	1.0	4	4.0	250	16	147	1.5	2,352	24	5,860	60	3 platoons = 1 engineer company(+) for 2 days
	2	Fix	1.0	6	6.0	250	24	147	1.5	3,508	36			
C	1	Block	2.4	3	7.2	500	15	630	5.0	9,450	75	18,900	150	8 platoons = 4 engineer companies for 2 days
	2	Block	2.4	3	7.2	500	15	630	5.0	9,450	75			
D	1	Block	2.4	3	7.2	500	15	630	5.0	9,450	75	26,082	203	10 platoons = 5 engineer companies for 2 days
	2	Block	2.4	4	9.6	500	20	630	5.0	12,600	100			
	3	Turn	1.2	3	3.6	500	8	504	3.5	4,032	28			
E	1	Disrupt	0.5	4	2.0	200	10	FSO determines exact requirements for artillery-delivered RAAMS/ADAM to support either Obstacle Zone E or F.						
F	1	Disrupt	0.5	4	2.0	200	10							
G	1	Fix	1.0	4	4.0	278	16	80 canisters	NA	640 canisters	Air Volcano; division controls assets. Mine quantities are in canisters.			

mines to the brigades to meet the requirements for each obstacle zone. The staff converts the platoon hours required into platoons required based on the actual time available. It then task organizes engineer units to the brigades to provide the necessary manpower. The staff may consider other sources of manpower (units other than engineers) when allocating engineer units.

CAPABILITY-BASED RESOURCING

The second technique for obstacle resourcing is to allocate obstacle materials based on the capability of units to emplace obstacles. Units have the capability to emplace only a certain amount of obstacle material in a given amount of time. For example, an engineer company can emplace a quantifiable number of conventional mines in one day.

Capability-based resourcing is a good technique to use when time is short. Early in the plan development, the staff identifies the main effort based on the concept of the operation. Based on the main effort, the staff develops a preliminary task organization. This task organization drives obstacle material resourcing. Although the staff concerns itself primarily with the engineer task organization, it does not ignore other units with obstacle emplacement capability.

The advantage of this technique is the early identification of obstacle material requirements. Obstacles require a large amount of material and transportation assets to haul the material. Engineer units have a limited capability for hauling obstacle material. The earlier the staff identifies the haul requirement, the easier coordination for haul assets becomes. This helps logistic planners who do not require great precision but certainly welcome early identification of requirements.

Figure C-3 illustrates the capability-based resourcing technique. The scenario used is

Based on the commander's intent and the concept of the operation, the priority of effort is to 2d Brigade, 1st Brigade, Cavalry Squadron, 3d Brigade, and Aviation Brigade (in that order). Based on troops available, the task organization is as follows:

Using 10 platoon hours/day x 150 $\frac{\text{mines}}{1.5}$ platoon hours = 1,000 mines/day

1st Brigade
Engineer Battalion
Engineer Company → **8 platoons x 1,000 mines/day = 8,000 mines/day**

2d Brigade
Engineer Battalion
Engineer Company → **8 platoons x 1,000 mines/day = 8,000 mines/day**

3d Brigade
Engineer Battalion(-)

Cavalry Squadron
Engineer Company → **2 platoons x 1,000 mines/day = 2,000 mines/day**

Figure C-3. Capability-based resourcing.

the division defensive scenario from *Chapter 4.* The staff developed a task organization for engineer units with one engineer battalion each in support of 2d Brigade and 1st Brigade. Both engineer battalions have an attached engineer company (from the third engineer battalion) for a total of eight engineer platoons each. In addition, the cavalry squadron has an attached engineer company (also from the third engineer battalion) for a total of two engineer platoons. (Note that the third engineer battalion HQ is conducting planning and coordination with 3d Brigade for the division CATK).

To determine the obstacle resources required by each brigade, the division staff determined the obstacle emplacement capability of the engineers in support of the brigades. The staff made several assumptions concerning obstacle emplacement capability. Based on the standard row minefield in *FM 20-32* and minefield planning data in *FM 5-34,* the staff assumed that an engineer platoon can emplace 100 mines per hour. The staff also assumed that the platoons can only do ten hours of effective work per day (subtracting time for travel, maintenance, resupply, rest, and so forth).

The staff multiplied the effective hours per day by the number of mines per hour and determined that the platoons can use 1,000 mines per day. The staff multiplied the number of engineer platoons in support of each brigade by the number of mines per day. This figure was the number of mines per day that each brigade can reasonably emplace given the engineer task organization.

In the examples above, the staff only considered the use of standard row minefield from *FM 20-32.* The staff could have used a different type of individual obstacle or a combination of different types. If it used the requirement-based method, for example, the staff could have substituted AD for part of the total linear obstacle effort required. For Obstacle Belt B1, the staff could have used 1,000 meters of AD and 3,000 meters of minefield instead of 4,000 meters of minefield. This would have reduced the total Class V and platoon hour requirement for Obstacle Belt B1 but would have added a requirement for digging assets.

Both of the resourcing techniques discussed above can be used at any level for planning resources. At the TF level, the staff uses the actual groups that it has planned rather than tentative obstacle-control measures. As with any other process, the staff abbreviates obstacle resourcing when time is short or adds detail if time allows. Whatever the technique used, staffs must make some reasonable assumptions when necessary. They also must use information and planning factors relevant to their organization.

OBSTACLE SUPPLY OPERATIONS

Obstacle material is Class IV or Class V material, which is requested and delivered through the maneuver unit's supply channels. Obstacle material is a maneuver unit responsibility. *Figure C-4 and Figure C-5, page C-8,* show the request flow and the supply flow for Class IV and Class V, respectively, from corps to TF level.

Class IV obstacle material requests originating at or below TF level go to the TF S4. The TF S4 sends supply requests to the forward support battalion (FSB). Class IV supply requests at brigade level also go to the FSB. The FSB sends the requests to the division materiel management center (DMMC). Supply requests originating at division level also go to the DMMC. The DMMC sends the request to the corps material management center (CMMC). Corps-level requests also go to the CMMC.

Issuing Class IV obstacle material usually involves large quantities of material. Corps

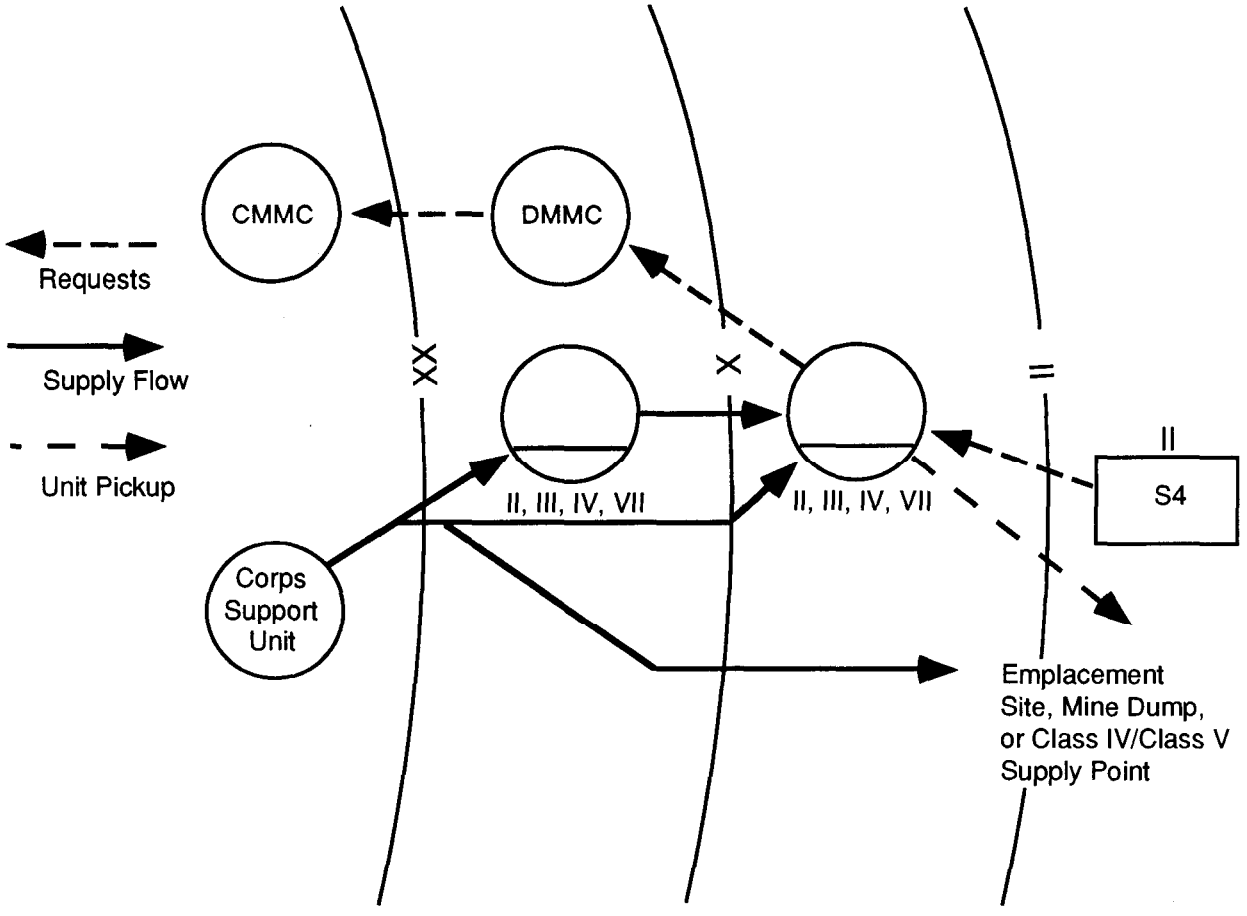


Figure C-4. Class IV obstacle material.

support elements deliver Class IV material directly to the emplacement sites using corps transportation assets.

Units request Class V obstacle materials somewhat differently. The TF S4 notifies the brigade S4 of Class V requirements. The brigade S4 notifies the division ammunition officer (DAO) in the DMMC who authorizes Class V issue by the ammunition transfer point (ATP). The DAO sends requests for Class V to the CMMC.

Class V obstacle material flows from the corps storage area (CSA) to the ammunition storage points (ASP) to the ammunition transfer points (ATP) or, more likely, straight to the ATP. Class V obstacle material, unlike most ammunition, is delivered to the user at the obstacle emplacement site.

A supply request includes the quantity, the required delivery time, the transportation responsibilities, and a desired location. The quantity includes the required quantity for each type of obstacle. There may be several Department of Defense identification codes (DODICs) and national stock numbers (NSNs) involved, depending on the types of obstacles required. The required delivery time is very important to ensure an early start on the preparation of the battlefield. Lack of material could adversely affect the mission. The transportation responsibilities must be clearly understood. MHE is required to ensure a rapid turnaround of haul assets.

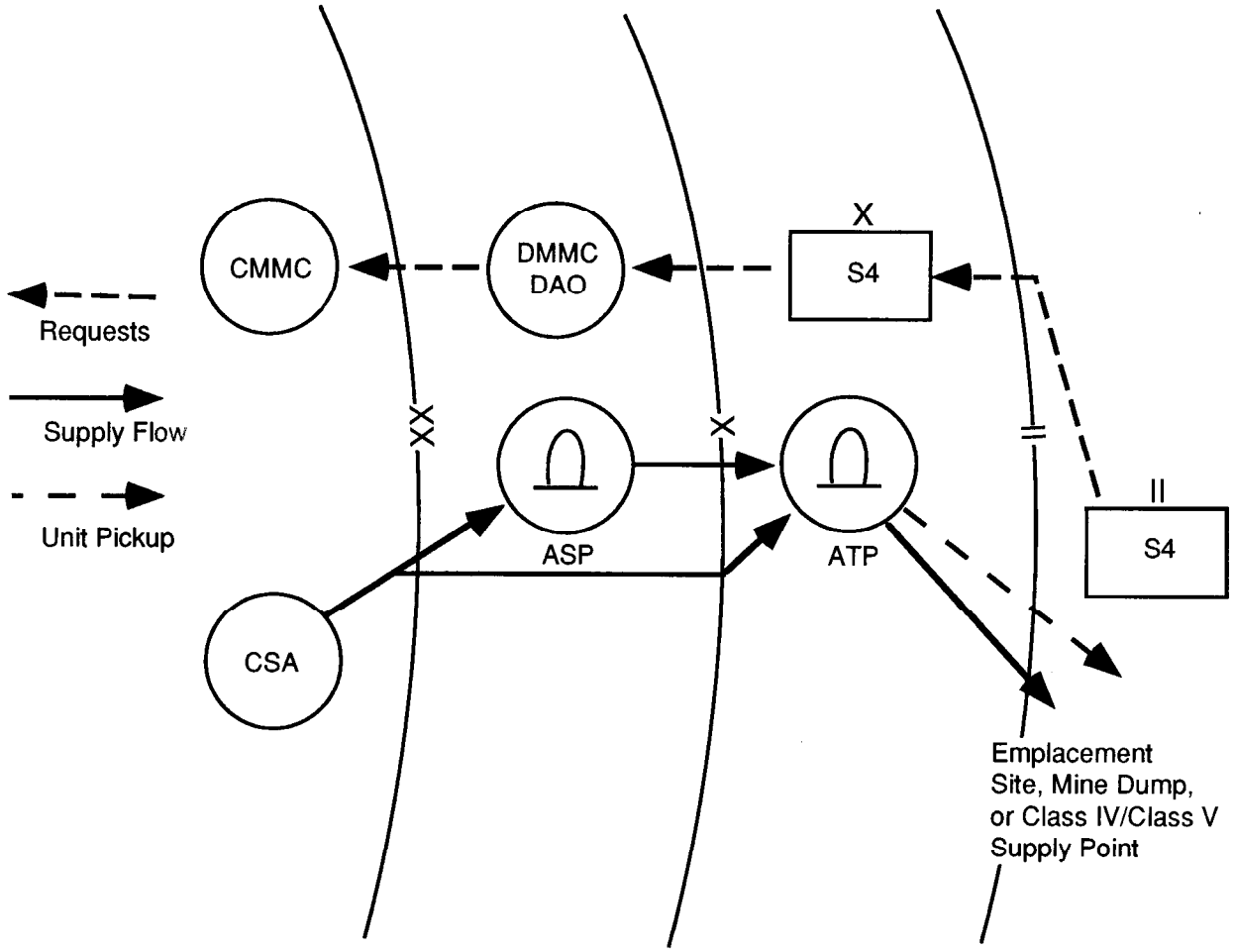


Figure C-5. Class V obstacle material.

In addition, the brigade staff identifies the location of Class IV/Class V points in the TF sectors in coordination with the TF staff. Prompt identification of the TF Class IV/Class V point is required if the obstacle material is forwarded from the corps into the TF sector. If the material is not forwarded into the TF sector, it becomes a brigade responsibility to deliver the material to the TF.

At the TF level, sustaining obstacle operations is an extremely difficult task. Centralized throughput operations by the corps or the division stops at the TF level. Mass quantities of obstacle material, especially mines, are centrally received, broken down into usable packages, and then distributed throughout the sector based on the obstacle plan. At some point in the distribution plan, the TF turns over control of the obstacle material to engineers who then emplace them. Obstacle logistics, especially for mine warfare, at the TF level can be complex, require prudent use of scarce haul and MHE, and demand positive C2.

In the case of obstacle groups developed at corps, division, or brigade level, obstacle material supply may vary slightly. The staff that is at the level where the obstacle group is planned in detail determines the resources required for the obstacle. It also plans how the emplacing unit will get the

materials. For example, if the corps staff plans a reserve obstacle group, but the detailed planning is done at TF level, the TF plans the resources for the obstacle group as it would any other obstacle group. However, if the corps staff plans the obstacle group in detail, it determines the resources required. In this case, the corps staff would also plan for delivery of the obstacle materials to the emplacing unit. Alternately, the corps staff could direct the emplacing unit to pick up the obstacle materials from a location such as the CSA.

OBSTACLE RESUPPLY NODES

There are two critical obstacle resupply nodes within the TF sector. Each of them has a different function in the obstacle resupply process if the material is not delivered directly to the emplacement site. They are the—

- Class IV/Class V supply point.
- Mine dump.

The relative location of the Class IV/Class V supply point and mine dumps are shown in *Figure C-6.*

Class IV/Class V Supply Point

The Class IV/Class V supply point is the central receiving point of obstacle material in the TF sector. It is the point at which the TF receives and transfers control of obstacle material pushed forward by higher levels. The supply point is established and operated by the TF and is centrally located to support all planned obstacles within the TF sector. Where the tactical obstacle plan allows, the supply point should be located near the TF combat trains to better facilitate C2 and the availability of equipment.

The main purpose of the Class IV/Class V supply-point operation is to receive obstacle materials and then reconfigure them based on the requirements for each obstacle group.

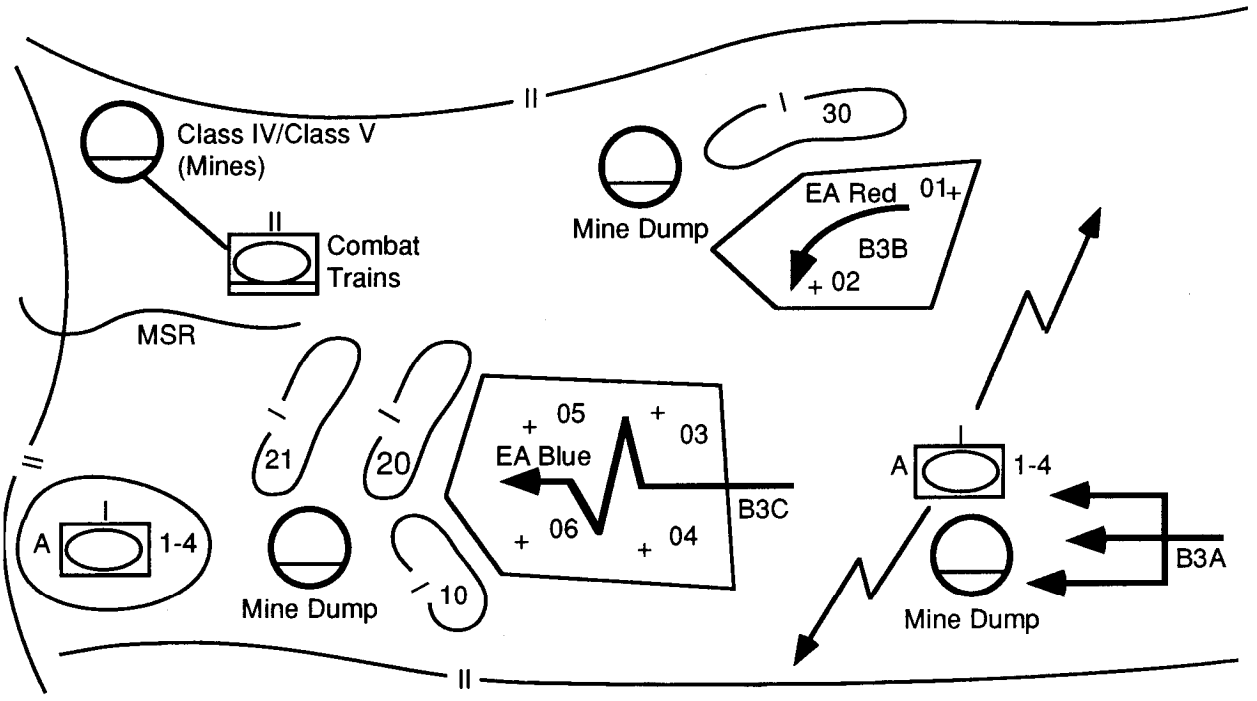


Figure C-6. Relative location of Class IV/Class V supply point and mine dumps.

This requires that the supply point must have a dedicated S4 representative to track the flow of obstacle material in and out of the supply point. The supply point should have dedicated MHE to off-load the bulk quantities of obstacle material and reconfigure them into obstacle packages, if required. Obstacle materials are normally broken down into obstacle packages if the materials are not already delivered in combat configured loads. This may require a dedicated engineer representative to ensure that the obstacle materials are configured properly.

The most labor-intensive task at the Class IV/Class V supply point is uncrating the mines. This requires dedicated manpower equipped with tools to break shipping bands and uncrate the mines from their containers. Another important aspect of uncrating mines is tracking fuzes and booster charges. As the mines are uncrated, fuzes and booster charges are separated; however, the same number and type of fuzes and boosters must be task organized with minefield packages. This requires strict supervision because mistakes can quickly lead to confusion and a waste of emplacement time.

Because of the assets involved in the Class IV/Class V supply point, a TF is normally capable of operating only one supply point at any given time. If the TF sector is extremely wide or deep, several supply points may be planned; however, only one can be operated at a time, based on the commander's priorities for obstacle emplacement.

Mine Dump

The mine dump is the most forward mine resupply node. It is the point at which mines are task organized into mine strip packages and inspected, prepared, and loaded onto the emplacing vehicle. It is not a permanent supply point. A mine dump is not always used; it depends on the method of minefield resupply. These techniques are discussed in more detail below. When used, one mine dump supports a single obstacle group. It is activated or deactivated upon initiation and completion of emplacing the obstacle group. Mine dump operations are primarily an engineer company or platoon responsibility. However, it is a good technique to augment mine dump operations with personnel from the company team overmatching the obstacle group being emplaced. The mine dump may be located either in the vicinity of the company team position or nearer to the obstacle group.

There are three critical tasks that must be accomplished at the mine dump.

- As minefield packages are transported to the mine dump, they are further task organized into strip packages, complete with the right number, type, and mix of fuzes and boosters. For example, if the platoon is emplacing a standard disrupt row minefield, mines are task organized into three packages. As the engineer platoon moves to the mine dump to resupply, each emplacing vehicle loads a designated package.
- The mines are prepared for emplacement. They are not fuzed at the mine dump. Preparation includes loosening and greasing fuze and booster wells and checking to ensure proper functioning.
- The mines are loaded onto the emplacing vehicles or delivery system.

Transportation of mines from the Class IV/Class V supply point to the mine dump is a supported TF responsibility; however, it is usually shared between the engineer company and the TF since neither one has the haul capability to simultaneously service all active mine dumps.

OBSTACLE RESUPPLY RULES

The following rules govern obstacle material resupply:

- Uncrate mines at the Class IV/Class V supply point to preserve transportation assets going forward.
- Task organize obstacle material into type packages at the Class IV/Class V supply points.
- Transport materials from the Class IV/Class V supply point to the mine dump (a shared engineer and maneuver unit responsibility) when a mine dump is used.
- Inspect and prepare mines at the last supply node (Class IV/Class V supply point or mine dump) before loading them onto the emplacing vehicle or dispensing system.
- Set up Class IV/Class V supply points using authorized ammunition procedures and distance requirements.

OBSTACLE SUPPLY LOCATIONS

Considerations for selecting a location for the Class IV/Class V supply point and/or mine dump are—

- Carrying capacity.
- Traffic circuit.
- Camouflage and cover.
- Defense.
- Time.
- Operators.

Carrying Capacity

The location of key supply nodes depends in part on the type, amount, and availability of haul assets. The carrying capacity plays a large role. In short, the more material a vehicle can carry, the more turn-around time you can afford. *Table C-3*, page *C-12*, provides the Class IV and Class V haul capacity for various types of vehicles.

Traffic Circuit

Vehicles must be able to enter, load, unload, and exit without interfering with the loading and unloading of other vehicles.

Camouflage and Cover

Protection from observation and thermal imaging is desired. Protection from artillery and air attack should be considered. Residue must be removed.

Defense

The site must be organized for defense against enemy patrols and saboteurs.

Time

Time factors to handle the obstacle material—to include all unloading, uncrating, inspecting, and loading—must be considered. Use of soldiers other than engineers to perform these functions can have a significant impact on obstacle capability.

Operators

Leaders and soldiers must be specifically allocated to operate mine dumps. They will probably remain there until the task is complete. The supply node may have to be collocated with or be near a source of manpower. *Table C-4, page C-12*, provides general guidance on how much manpower is required to sustain mine resupply operations.

OBSTACLE MATERIAL RESUPPLY METHODS

The methods for obstacle material resupply are—

- Supply point.
- Service station.
- Tailgate.

In each method, corps or division transport delivers Class IV/Class V supplies forward

Table C-3. Class IV and Class V haul capacity.

Vehicle	Concertina Wire	M15 AT Mine	M19 AT Mine	M21 AT Mine	M16 AP Mine	MOPMS Mine	Flipper Mine	Volcano Mine
HMMWV, M998 2,500 lb 215 cu ft	2	51	34	27	55	15	11	1
21/2-Ton Truck 5,000 lb 443 cu ft	4	102	69	55	111	30	23	2
5-Ton Truck 10,000 lb 488 cu ft	7	204	138	109	222	61	46	5
5-Ton Dump Truck 10,000 lb *135/291 cu ft	2/4	112/204	64/138	32/70	168/222	23/51	39/46	3/5
20-Ton Dump Truck 40,000 lb 754 cu ft	11	628	443	179	888	132	184	20
HEMTT Truck 20,000 lb 540 cu ft	8	408	277	128	444	94	92	10
12-Ton S&P 24,000 lb 875 cu ft	13	489	333	208	533	148	110	12
40-Ton Lowboy 80,000 lb 1,760 cu ft	27	1,466	1,035	419	1,777	308	368	43
M548 12,000 lb 529 cu ft	8	244	166	125	266	74	55	6
#/Wt/lb / Cube cu ft	40/ 1,180 / 64	1/ 49 / 1.2	2/ 72 / 1.6	4/ 91 / 4.1	4/ 45 / 0.8	21/ 162 / 5.7	40/ 217 / 3.4	240/ 1,850 / 37.6

For concertina = bundles; 1 bundle = 40 rolls * Without/with sideboards

Table C-4. Mine dump planning factors.

Number of Personnel	Quantity of Mines
2-man team (2 minutes per mine)	25 mines/hour
Squad (8 soldiers)	100 mines/hour
Platoon	300 mines/hour; 3,600 mines/day
Company	10,800 mines/day

NOTE: Soldiers work 50 minutes per hour, 12 hours a day.

to a designated Class IV/Class V point in each TF sector. The primary differences in each method are how the material is delivered from the Class IV/Class V point to the obstacle location and whether or not a mine dump is activated in the resupply chain.

Supply Point

The supply-point technique requires that the emplacing engineer platoon return to the Class IV/Class V supply point each time it must resupply. *Figure C- 7, page C-14,* illustrates the supply point method of resupply. The supply-point technique does not activate a separate mine dump. In effect, it moves the normal tasks associated with a mine dump to the supply point. Mines are prepared and inspected at the supply point as they are loaded onto the emplacing vehicle or dispenser.

Several considerations may affect the use of supply point resupply. First, if there are no additional haul assets to transport obstacle material forward from the Class IV/Class V supply point, the supply-point method may be the only viable technique. Second, the obstacle may be close enough to the supply point that any other method is less efficient.

Advantages. The advantages to a supply point are that it—

- Minimizes unloading and loading of material.
- Requires minimal augmentation of haul assets.
- Allows manpower and equipment to be massed at a single supply point.
- Streamlines C2 of material.

Disadvantages. The disadvantages to a supply point are that it—

- Requires more movement of the platoon, which may take away from emplacement time.
- Requires that the platoon move in and out of the area.
- May disrupt the emplacement of individual obstacles when emplacing vehicles cannot carry enough material to start and complete the obstacle. This causes emplacing vehicles to stop work, reload, and pick up where they left off.
- Requires a larger Class IV/Class V supply point capable of receiving mass quantities of obstacle material and loading platoons simultaneously.
- Does not afford an opportunity to task organize obstacle packages.

Service Station

The service-station technique centers on the activation of a mine/obstacle dump forward of the Class IV/Class V supply point (see *Figure C-8, page C-15).* In the service-station method, mines/material are transported to a mine/obstacle dump using a combination of engineer and TF haul assets that are normally under the control of the emplacing engineer. At the mine/obstacle dump, material is stockpiled and prepared by the mine/obstacle dump party. Obstacle material is further task organized into packages. The emplacing platoon moves to the mine/obstacle dump to resupply emplacing vehicles or dispensers. Once the obstacle group is emplaced, the mine/obstacle dump is deactivated or moved to support another obstacle group.

There are several considerations for using the service-station resupply method:

- It is used when the obstacle group is located too far from the Class IV/Class V supply point to allow efficient turnaround.
- It is used when available haul assets have a relatively small capacity. This requires frequent short-duration resupply trips and stocking mines to keep pace with emplacement.
- It streamlines emplacement since there is an opportunity to task organize

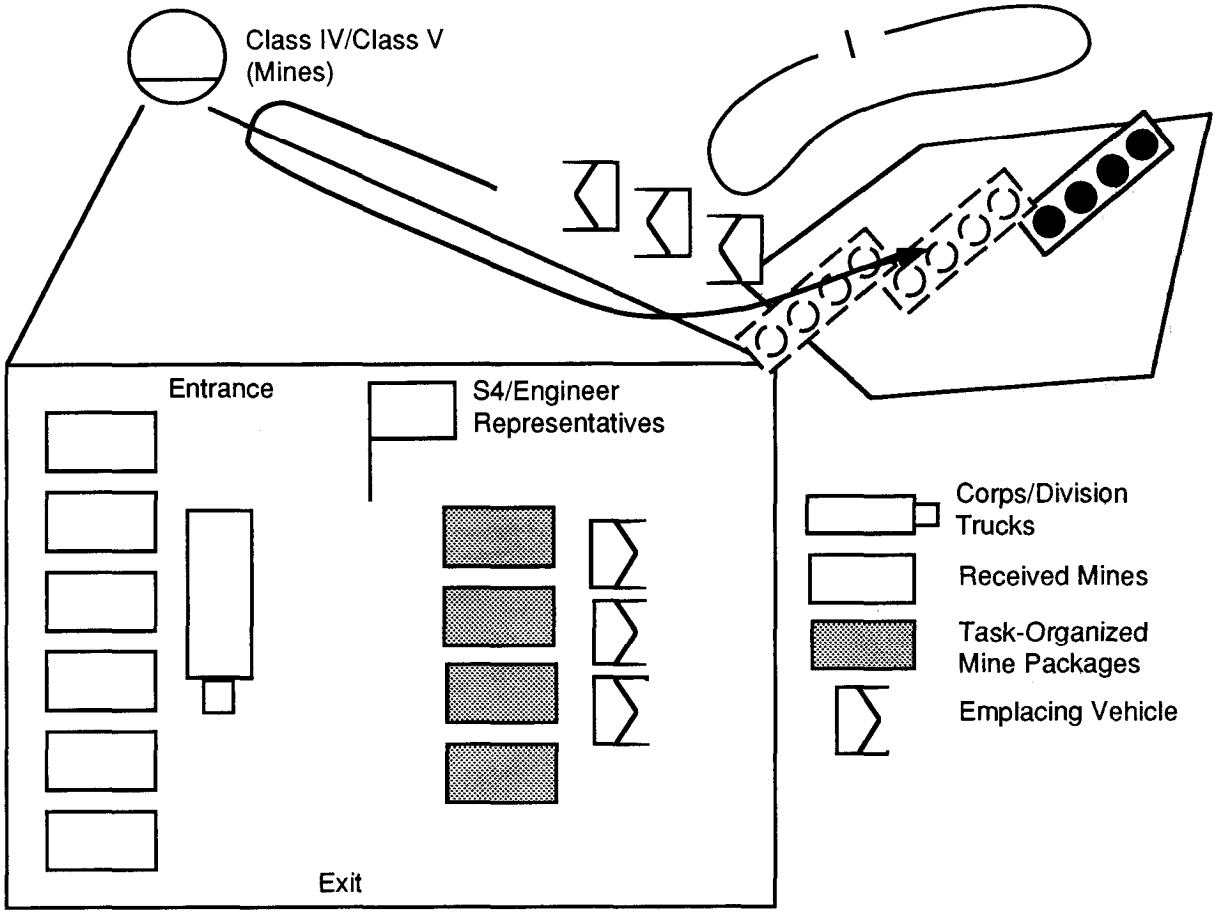


Figure C-7. Supply point distribution.

the mines into strip packages based on the emplacement method and type of minefield.

- While it still requires the emplacing platoon to stop laying and resupply, it minimizes the distance and time the platoon must travel to reload. This requires that a small party be left at the minefield to assist in picking up where emplacement stopped.

Advantages. The advantages to the service-station resupply method are that it—

- Allows for prestockage of obstacle material to keep pace with emplacement.
- Minimizes the distance and time the emplacing platoon must travel to reload.
- Allows for obstacle packages.
- May provide additional manpower and security if it is located near a company team.

Disadvantages. The disadvantages to the service-station resupply method are that it—

- Requires additional loading and unloading of obstacle material.
- May require augmentation with haul assets.
- Disrupts emplacement by requiring the emplacing platoon to stop obstacle

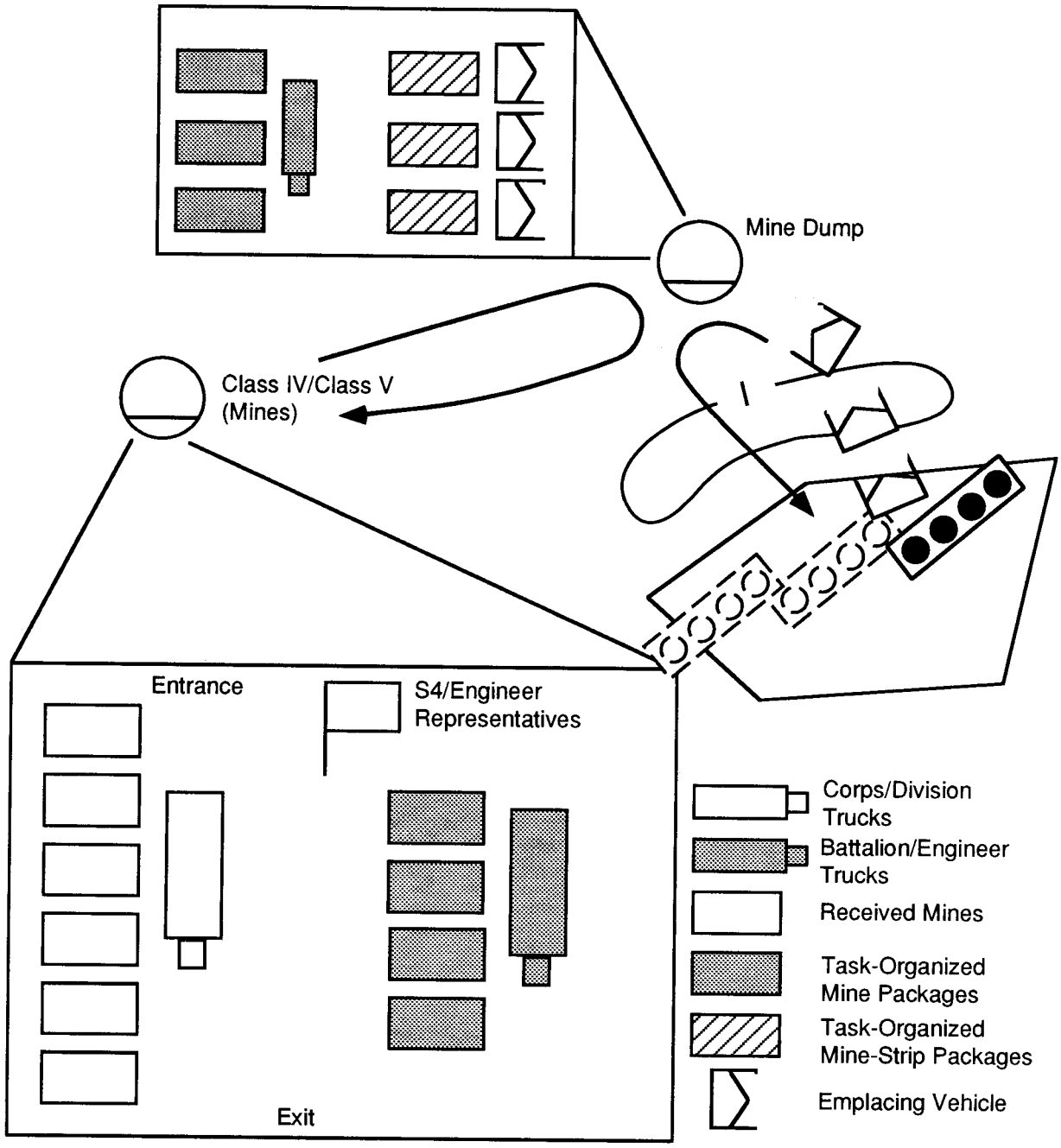


Figure C-8. Service-station distribution.

emplacement, move to the supply point, reload, and return to the minefield.

Tailgate

The tailgate resupply method transports obstacle material directly from the Class IV/Class V supply point to the emplacing platoon on the site (see *Figure C-9).* Obstacle material is transported to the emplacing platoon using both TF and engineer haul assets. At the obstacle site, obstacle material is loaded onto emplacing vehicles or dispensers. This action is performed by emplacing engineers rather than a separate party.

Two overriding considerations drive the decision to use the tailgate resupply method:

- If obstacle emplacement is being conducted during limited visibility, the tailgate method minimizes disruption of emplacement and chance of fratricide as engineers move back into a work area after reloading.
- The tailgate method is used when establishing a hasty defense or when the situation is unclear and an attack can happen at any time. Since obstacle material remains loaded until transferred to the emplacing vehicle, the tailgate method enables engineers to

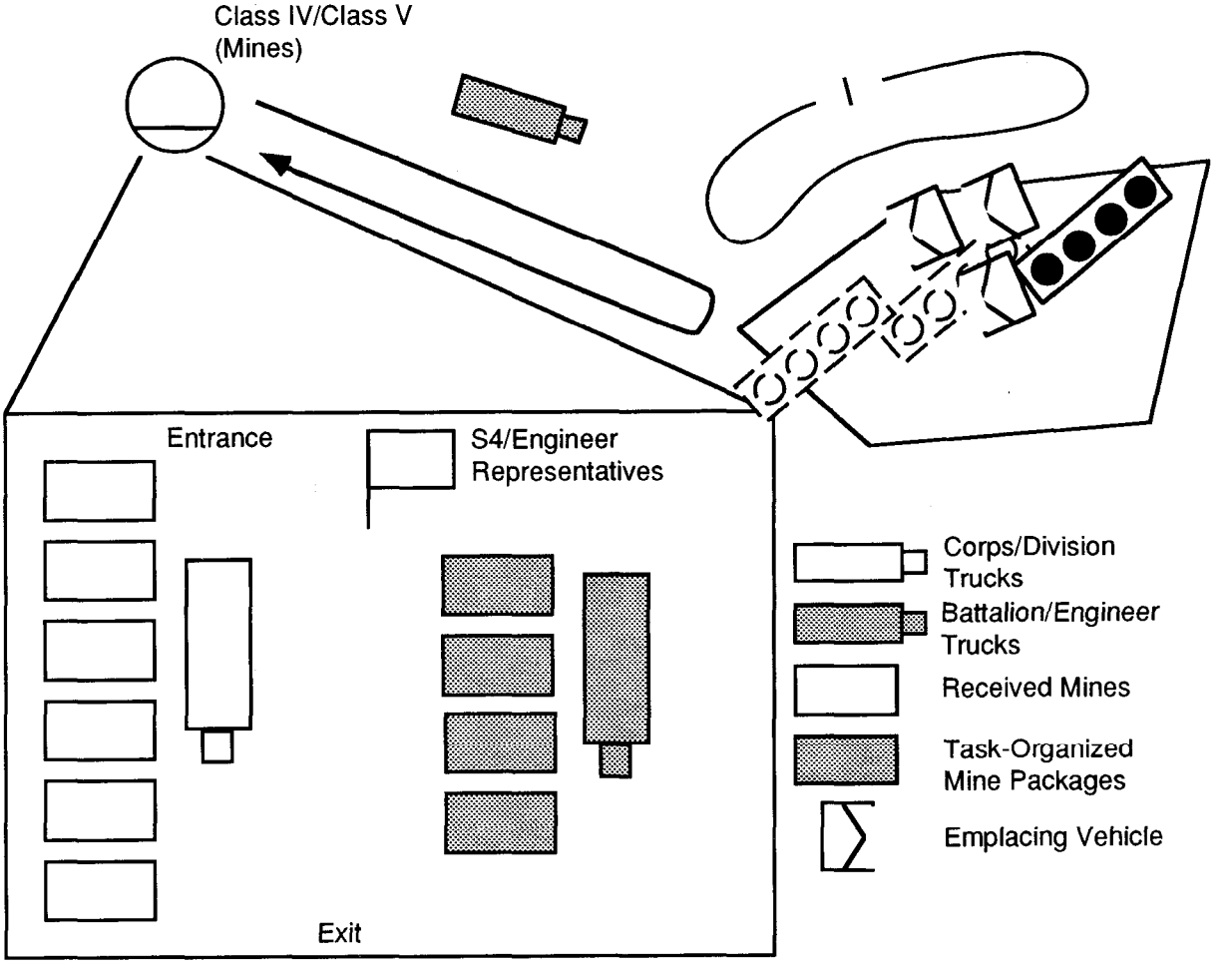


Figure C-9. Tailgate distribution.

quickly break contact without risking a loss of obstacle material to the enemy. The tailgate resupply method is the preferred method for light forces.

Advantages. The advantages to the tailgate resupply method are that it—

- Minimizes loading and unloading of obstacle material.
- Allows engineers to rapidly break contact, in the event of enemy attack, without losing obstacle material to the enemy.
- Minimizes the movement of platoons in and out of the obstacle (suitable for limited visibility).

Disadvantages. The disadvantages to the tailgate resupply method are that it—

- Requires augmentation by high capacity transportation assets capable of offsetting the loss in turn-around time if the vehicle has to wait on-station at the obstacle site.
- May result in inefficient use of haul assets.
- Complicates C2 in linking up obstacle transport assets with emplacing engineers as the engineers continue emplacement.
- Requires that task organizing of obstacle packages and loading occur concurrently.

Glossary

#	number
AA	avenue of approach
ACE	armored combat earthmover
ACR	armored cavalry regiment
AD	armored division
AD	antitank ditch
ADAM	area denial artillery munition – An artillery munition that contains antipersonnel scatterable mines.
AHD	antihandling device – A device designed to detonate a mine if the mine is disturbed.
AI	air interdiction
ALO	air liaison officer
AO	area of operation
AP	antipersonnel
ASP	ammunition storage point
AT	antitank
ATTN	attention
ATP	ammunition transfer point
BFV	Bradley fighting vehicle

BHL	battle handover line
BOS	battlefield operating system
BP	battle position
C2	command and control
CAS	close air support
CATK	counterattack
CEV	combat engineer vehicle
CFL	coordinated fire line
CMMC	corps materiel management center
co	company
COA	course of action
CP	command post
CSA	corps storage area
CSS	combat service support
cu	cubic
DA	Department of the Army
DAO	division ammunition officer
DATK	deliberate attack
DMMC	division materiel management center
DODIC	Department of Defense identification code

DP	decision point
DPICM	dual-purpose improved conventional munition
DST	decision support template
DTG	date-time group
EA	engagement area
EBA	engineer battlefield assessment
EW	electronic warfare
FASCAM	family of scatterable mines
FEBA	forward edge of the battle area
FIST	fire-support team
FLOT	forward line of own troops
Flipper	The M138 Flipper is a manual dispenser capable of dispensing anti-tank and antipersonnel scatterable mines. It can be mounted on a variety of ground vehicles.
FM	frequency modulated
FM	field manual
FO	forward observer
FPF	final protection fires
FSB	forward support battalion
FSCL	fire-support coordination line
FSCOORD	fire-support coordinator

FSO	fire-support officer
ft	foot, feet
G2	Assistant Chief of Staff, G2 (Intelligence)
G3	Assistant Chief of Staff, G3 (Operations and Plans)
Gator	A scatterable mine system delivered by Air Force and Navy tactical aircraft.
GDP	general defense plan
GEMSS	Ground-Emplaced, Mine-Scattering System
GPBTO	general-purpose barbed-tape obstacle
GSR	ground surveillance radar
HATK	hasty attack
HMMWV	high-mobility multipurpose wheeled vehicle
HQ	headquarters
HPT	high payoff target
hr	hour(s)
ID	infantry division
IFV	infantry fighting vehicle
IOE	irregular outer edge
IPB	intelligence preparation of the battlefield
JAAT	joint air attack team

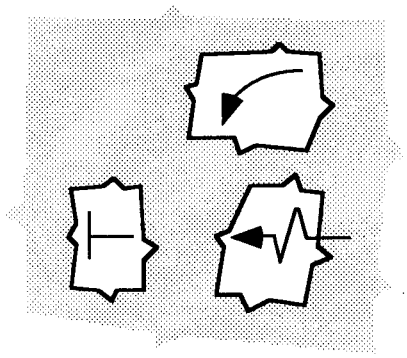
km	kilometer(s)
kph	kilometer(s) per hour
lb	pound(s)
LC	line of contact
LD	line of departure
LOC	lines of communication
LOGPAC	logistical package
LP	listening post
LRP	logistics release point
m	meter(s)
MBA	main battle area
MC	mobility corridor
MCOO	modified combined obstacle overlay
MCS	Maneuver Control System
METT-T	mission, enemy, troops, terrain, and time available
MF	minefield
MHE	materials handling equipment
MICLIC	mine-clearing line charge
MO	Missouri
MOPMS	Modular Pack Mine System – The M131 MOPMS is a man-portable,

	suitcase-shaped, scatterable mine dispenser capable of emplacing 17 antitank mines and 4 antipersonnel mines.
MOUT	military operations on urbanized terrain
MRD	motorized rifle division
M/S	mobility/survivability
MSR	main supply route
MTC	movement to contact
NA	not applicable
NAI	named area of interest
NBC	nuclear, biological, and chemical
NCO	noncommissioned officer
NFA	no-fire area
NLT	not later than
NSN	national stock number
obj	objective
OCOKA	observation and fire, cover and concealment, obstacles, key terrain, and avenues of approach
OOTW	operations other than war
OP	observation post
OPLAN	operation plan
OPORD	operation order

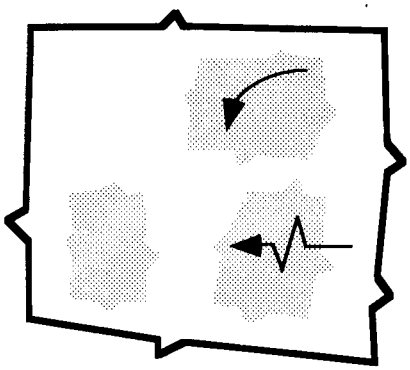
OPSEC	operations security
PDM	pursuit deterrent munition
PH	platoon hour
PL	phase line
plt	platoon
R&S	reconnaissance and surveillance
RAAM	remote antiarmor mine – An artillery munition containing antitank scatterable mines.
RC	road crater
req	required
S2	Intelligence Officer (US Army)
S3	Operations and Training Officer (US Army)
S4	Supply Officer (US Army)
SCATMINE	scatterable mine
SCATMINWARN	scatterable mine warning
SD	self-destruct
SFC	sergeant first class
SITEMP	situation template
SOP	standing operating procedure
S&P	stake and platform

STANAG	Standardization Agreement
TAI	targeted area of interest
TCP	traffic control post
TECCS	Tactical Engineer Command and Control System
TF	task force
TO	theater of operation
TOW	tube-launched, optically-tracked, wire-guided antitank missiles
TRADOC	US Army Training and Doctrine Command
TRP	target reference point
TTP	tactics, techniques, and procedures
US	United States
UXO	unexploded ordnance
Volcano	The multiple delivery mine system consisting of the M87 mine canister, the M139 dispenser, and specific vehicle mounting kits. The system is capable of being dispensed from the air by a helicopter or from the ground from both tracked and wheeled vehicles. It includes both AT and AP mines.
WAM	wide area mine – An antitank mine that detects and acquires targets then launches a submunition that attacks the top of the targets.
wt	weight
XO	executive officer

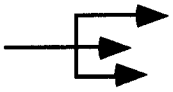
Object Symbols



Obstacle belts

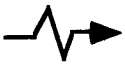


Obstacle zone



Disrupt

Turn



Fix

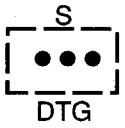
Block

Generic obstacle

Prepared demolition state 2

Prepared bridge demolition state 2

Executed or fired demolition reinforced with antitank mines



Future or projected scatterable minefield

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By Order of the Secretary of the Army:

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